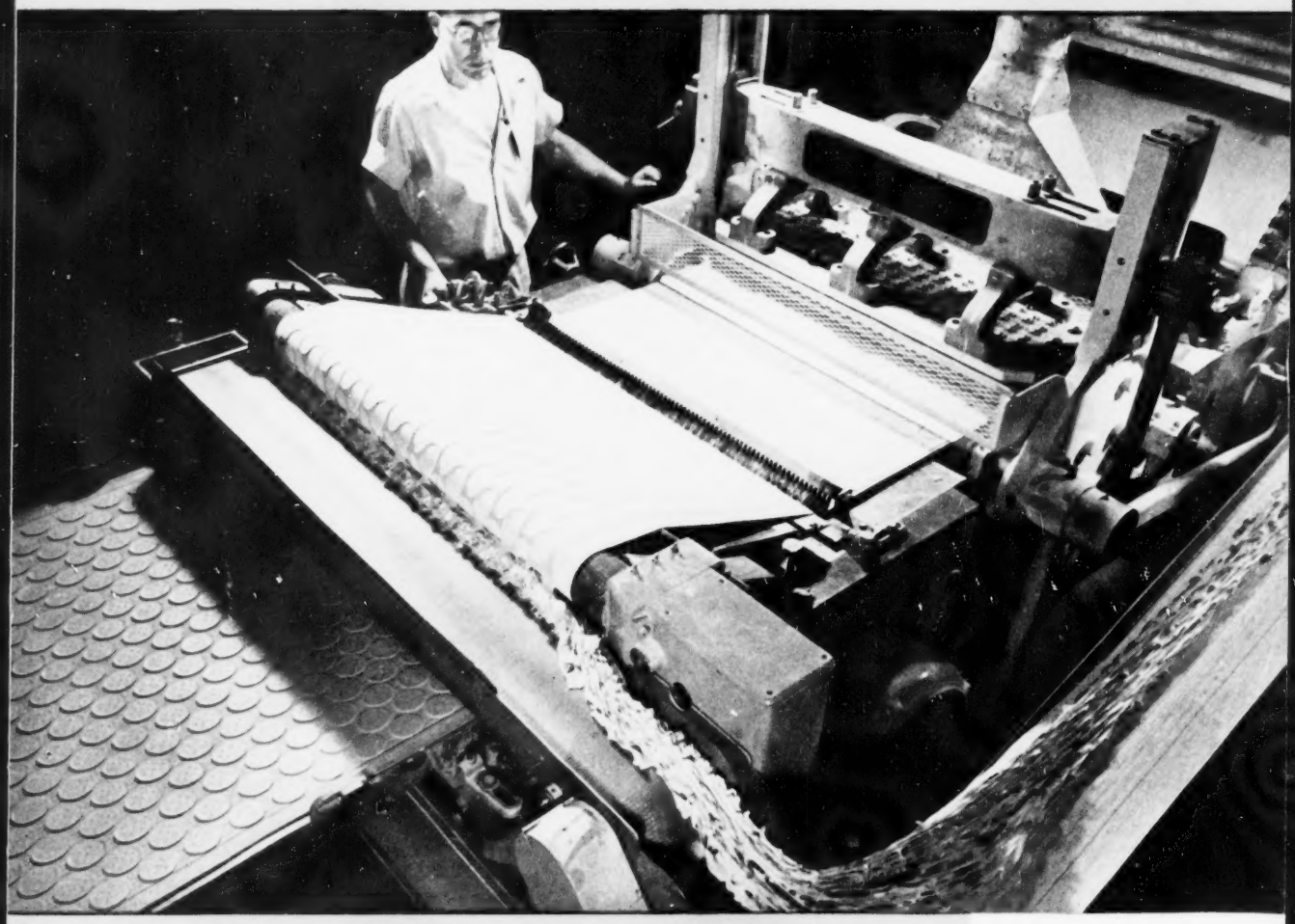
FOOD ENGINEERING

August 1953

A MAGAZINE-PUBLICATION • FOR MEN IN THE FOOD INDUSTRIES

35 CENTS



STAMPED-OUT crackers pour from cutter in NBC plant. Left-over dough streams back to hopper for re-use. (Page 57)

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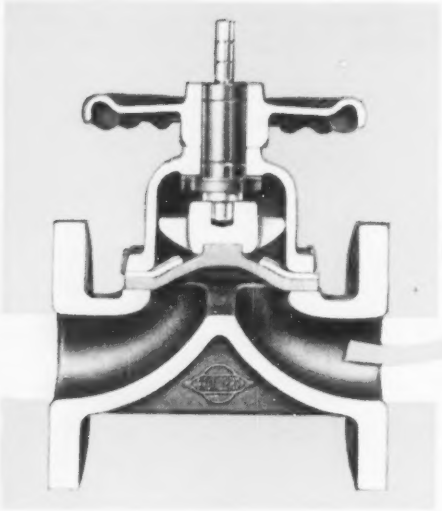
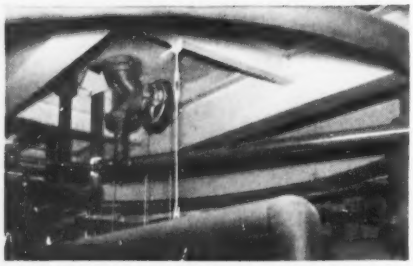


STREAMLINED

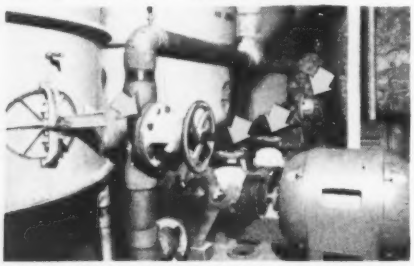
to prevent trapping, clogging, contamination!

Good reasons, all of them, why Haffenreffer & Co., Boston brewery, depends on

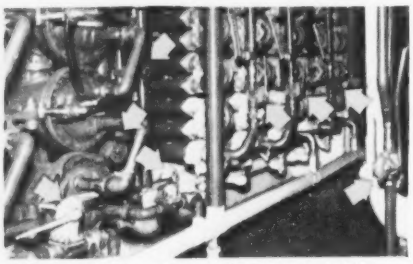
GRINNELL-SAUNDERS DIAPHRAGM VALVES



BREWING KETTLE — this 900 barrel stainless steel kettle at Haffenreffer is equipped with a 6" bronze body, chain wheel operated Grinnell-Saunders Diaphragm Valve, with flanged ends, cast iron bonnet, and neoprene diaphragm.



WATER TANKS — showing four 4" bronze body Grinnell-Saunders Diaphragm Valves, with solder ends, cast iron bonnets, neoprene diaphragms.



WORT COOLERS — utilizing 8 Grinnell-Saunders Valves as follows: two 2" bronze body with socket ends, cast iron bonnet, neoprene diaphragm, six quick-operating socket end Saunders valves with bronze bodies.

Diaphragm lifts high for streamline flow. Smooth, streamlined passage, without pockets, prevents trapping of solids and consequent growth of bacteria. Where applicable, polished interiors prevent formation of mold. Frictional resistance is at a minimum—regardless of direction of fluid flow. No disc holder in fluid stream. Self-draining when installed with the spindle at 15 degrees above the horizontal position. Valve lubrication cannot contaminate the liquid in the line.

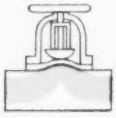
Diaphragm gives leak-tight closure against grit, scale, suspended solids. The resilient diaphragm, plus the large area of contact, gives leak-tight closure against pressure or vacuum.

Body, lining and diaphragm materials to meet service condition. Bodies stocked in cast iron, malleable iron, stainless steel, bronze and aluminum; other materials on special orders. Valve bodies lined with lead, glass, natural rubber or neoprene. Diaphragm materials of natural rubber or synthetics to suit particular service conditions. (A special white diaphragm, which imparts no taste or color to beer and is unaffected by caustic soda or steam cleaning, is made available for brewery use.)

Minimum maintenance. No refacing or reseating is required. New diaphragms can be inserted without removing valve from the line.

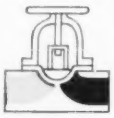
Write for Grinnell-Saunders Diaphragm Valve catalog.

VALVE OPEN



- No packing glands to demand attention.
- Working parts completely isolated from fluid . . . sticking, clogging, corrosion eliminated.

VALVE CLOSED



- Compressor and finger plate supports the diaphragm in all positions.
- No metal-to-metal seats to become damaged or wire-drawn.

GRINNELL

WHENEVER PIPING IS INVOLVED

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
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Food Engineering

Vol. 25 • AUGUST, 1953 • No. 8

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FOOD ENGINEERING (Formerly Food Industries)

August 1953 Vol. 25, No. 8

Member ABC and ABP

Published Monthly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. **Publication Office 99-129 N. Broadway, Albany 1, N. Y.**

Executive, Editorial and Advertising Offices, McGraw-Hill Building, 330 W. 42nd St., New York, 36, N. Y. Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President & Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Div.; Ralph B. Smith, Vice-President and Editorial Director; Nelson Bond, Vice-President & Director of Advertising; J. E. Blackburn, Jr., Vice-President & Director of Circulation.

Subscriptions: Address correspondence to Food Engineering—Subscription Service, 99-129 N. Broadway, Albany 1, N. Y. or 330 W. 42nd St., New York 36, N. Y. Allow one month for change of address.

Subscriptions are solicited only from the executives, engineers, and technologists in food processing plants. Position and company connection must be indicated on subscription orders.

Single copies 35¢. Subscription rates—U. S. and possessions $2 for 1 yr., $3 for 2 yr., $4 for 3 yr. Canada, $3 for 1 yr., $4 for 2 yr., $5 for 3 yr. Other Western Hemisphere countries $10 for 1 yr., $16 for 2 yr., $20 for 3 yr. All other countries, $15 for 1 yr., $25 for 2 yr., $30 for 3 yr. Entered as 2nd class matter Aug. 26, 1948, at Post Office at Albany, N. Y. under Act of Mar. 3, 1879. Printed in U.S.A. Copyright 1953 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved.

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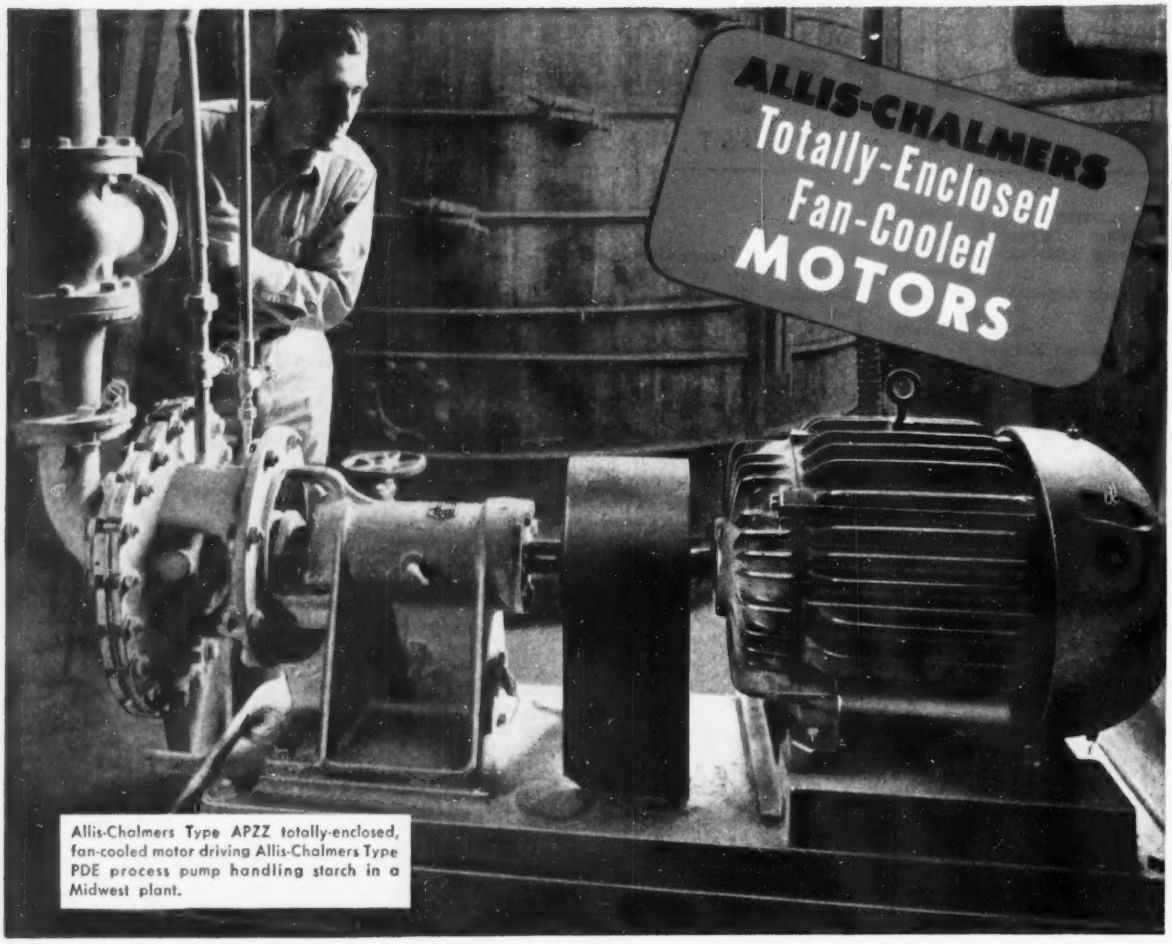

Allis-Chalmers Type APZZ totally-enclosed, fan-cooled motor driving Allis-Chalmers Type PDE process pump handling starch in a Midwest plant.

Get These 3 Low Maintenance Features

1 Wide Open Air Flow

No enclosed external air passages to clog. Easy to clean with cloth, brush, air hose or vacuum. Simply remove fan cover and whole radiating surface is exposed for inspection and cleaning.

2 Cast Iron Construction

Frame, conduit box and fan cover of cast iron resist corrosion. Fan is non-sparking, corrosion-resistant material. Well suited to outdoor operation.

3 Pre-lubricated Bearings

Ball bearings are double-shielded type, pre-lubricated at the factory. Periodic lubrication is not required under normal operating conditions, but provision is made for in-service lubrication if necessary.

GET COMPLETE INFORMATION on Allis-Chalmers motors for indoor and outdoor service — complete with Allis-Chalmers coordinated control — from your nearby A-C Authorized Distributor or District Office, or write for Bulletins 51B7286 and 51B7149. Allis-Chalmers, Milwaukee 1, Wisconsin.

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ALLIS-CHALMERS

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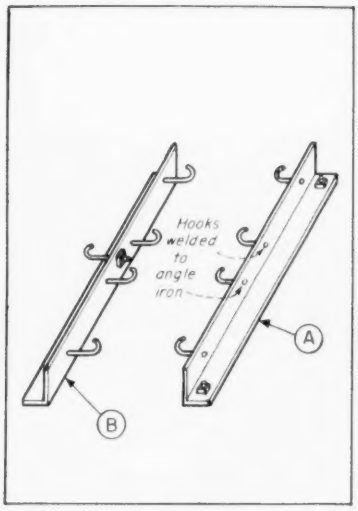
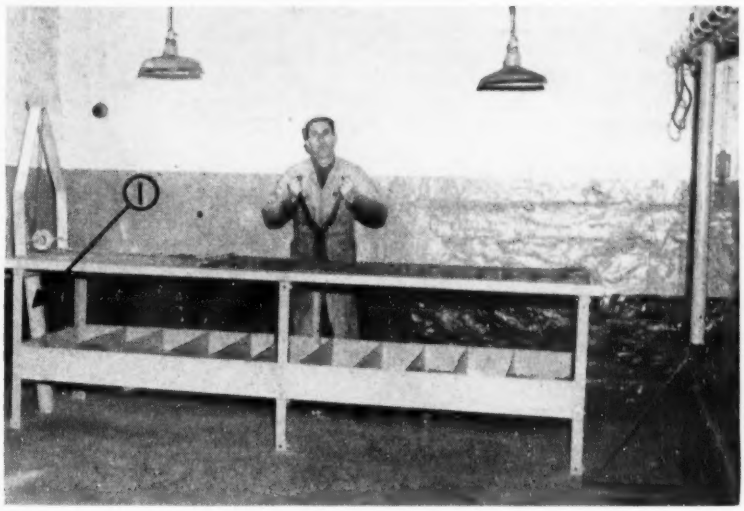
PRACTICAL IDEAS





Rig Speeds Tire-Chain Repairs

By designing a bench, with special attachments to facilitate the overhaul of truck tire-chains, repair of the latter has been geared to the point where two men can work together speedily.

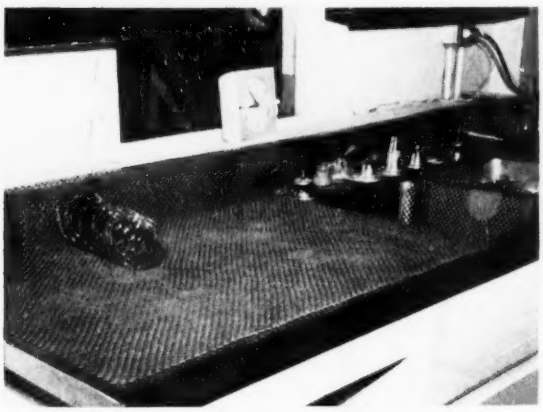
This is how the bench is constructed and is used:

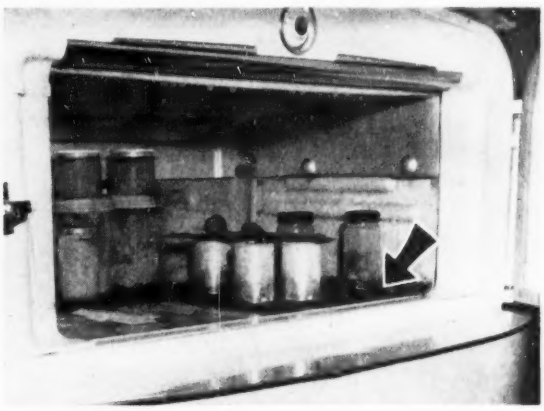
Length of bench is made a foot or so more than the length of the longest chain to be repaired. At one bench-end is bolted a length of angle iron—(A) in sketch—to which four hooks are attached. To a similar arrangement (B), not anchored to the table, a cable is attached to hold the chains taut when stretched between the two sets of hooks.

Tension on the cable and chains is maintained by a heavy weight moving up and down in a housing—(1) in photo—made of a length of pipe. Confining the movement of the weight inside a pipe-casing avoids the possibility of injured feet when the weight drops.

During periods of heavy snow and after the thaw, two workers are stationed on opposite sides of the bench. One attaches chains between the two sets of hooks and cuts away defective links. The other inserts replacement parts, and when repairs are finished, removes chains to rack (right in photo). Spare parts for all sizes and lengths of chains used on company trucks, are kept in accessible built-in compartments below the work table.

As repair requirements slacken, just one worker is stationed at the bench.—*James Owens, Fleet Manager, Abbotts Dairies, Inc., Philadelphia.*



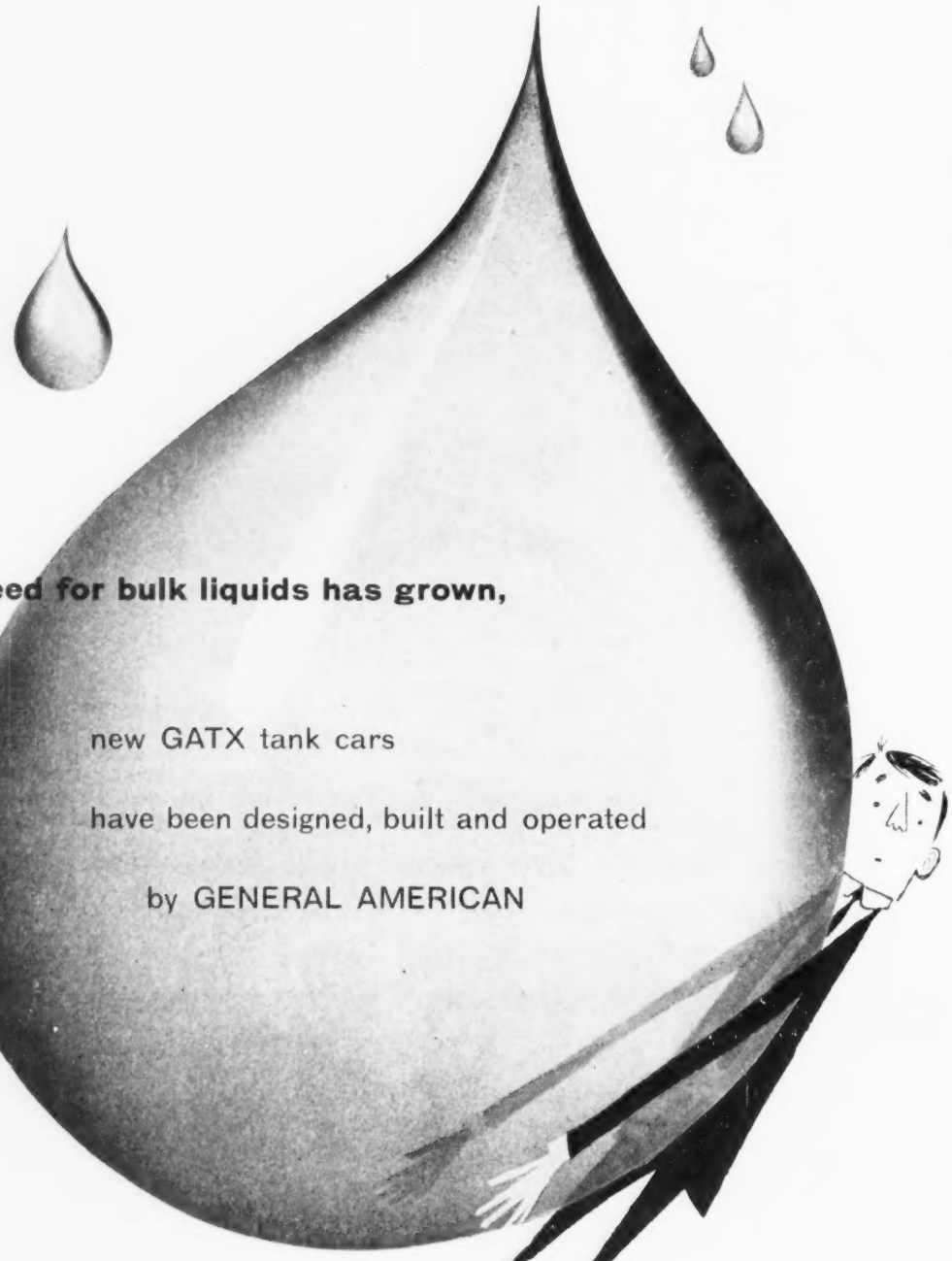


Two Uses for Open-Web Neoprene Mats

Breakage of glass-ware was materially reduced in our laboratories when we covered sink washing and draining surfaces with a Neoprene-coated open mesh fabric, resembling expanded metal in appearance.

Not only has breakage been curbed, but draining and air-drying glass-ware has been speeded. For example, long files of Petri dishes now stay put when lined up on mat (see left photo) at advantageous draining angle. No longer is there danger that last few in file will slide off table.

Same style mat, we have found, has another important application. When used as flooring (see right photo) in freezer compartment of our refrigerators, samples are easily removed. Without Neoprene-mat floor, they soon freeze to floor of compartment.—*Paul Nussdorfer, Chief Analytical Chemist and P. G. McGowan, Laboratory Manager, Gerber's Baby Foods, Freemont, Mich.*

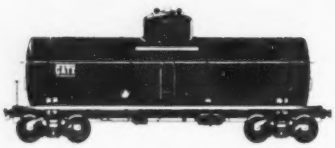


as the need for bulk liquids has grown,

new GATX tank cars

have been designed, built and operated

by GENERAL AMERICAN



For dependability, the GATX fleet of 46,000 tank cars contains more than 200 specialized types to meet the needs of shippers of bulk liquids.

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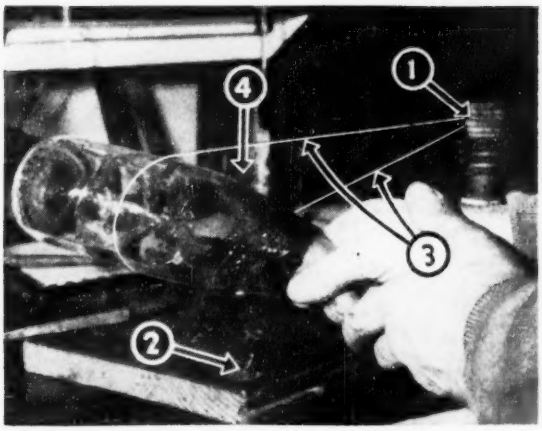


Homemade Glass Container Cutter

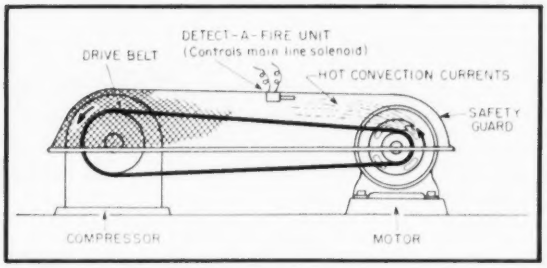
For occasions when there is need for cutting glass tubing and other laboratory glassware—even bottles—a tool can be made which is both inexpensive and efficient. Cutter can be fabricated from coil element of an electric space-heating unit.

Converted to glass cutting in the laboratory at Garrett and Co., winery in Brooklyn, was unit with heating coils spiraled around a cone-shaped refractory—(1) in photo.

To make the cutting assembly, detached unit was mounted on a board shielded with asbestos-graphite and wired to a switch (2). A portion of coil was unwound to form a loop (3) into which to insert glass cylinder to be cut.

To perform cutting operation, a mark is filed on glass equipment where the cut is to be made. Then glassware—a bottle in photo—is placed inside the loop, wire lined-up with file mark.

Flipping switch sends current through the wire to heat it incandescent, severing bottle along filed line. Bottom of bottle (4) may now be used as a burrette-drippage cup.—*R. S. Fellers, Garrett & Company, Inc., Brooklyn.*



Ends Hot Belt Fire Hazard

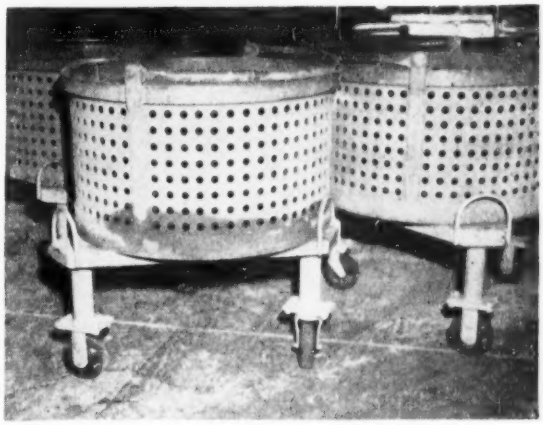
Merely by locating a simple heat sensitive control unit underneath the guard over belts driving approximately 75 refrigeration compressors at Penn Fruit Co's. 26 outlets, belt fires have been eliminated. Formerly, fires of this origin averaged 5-6 yearly.

Now, when either motor or belts overheat due to overload, belt slippage or frozen shaft, generated heat is carried by convection currents to a Fenwall detector mounted just above belt (see sketch) and midway between motor and compressor.

On indoor compressors, instruments are set to operate when temperature reaches 140 deg. F. Outdoors, controls kick-off at 180 deg. When temperature level actuates a control, a 110-220 volt solenoid interrupts power to entire compressor system.

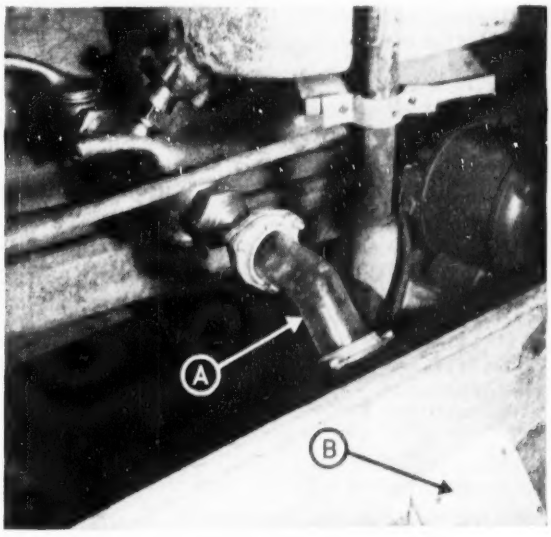
Shock resistant detectors, hermetically sealed in corrosion resistant case, are tamper-proof since control is pre-set and sealed by the manufacturer.

Since controls have been installed belt fires have been eliminated, compressor maintenance reduced, and equipment life increased. Overheating is now detected before real damage can result.



Swivel Caster Improves Crate Truck

Carriages on which retort crates are transported, were made easier to maneuver when one of three stationary-type casters was replaced by a swiveling caster. Now, if truck is pushed with two stationary casters to the front and pivoting caster trailing, carriages can be maneuvered easily along desired course.—*F. E. Staff.*



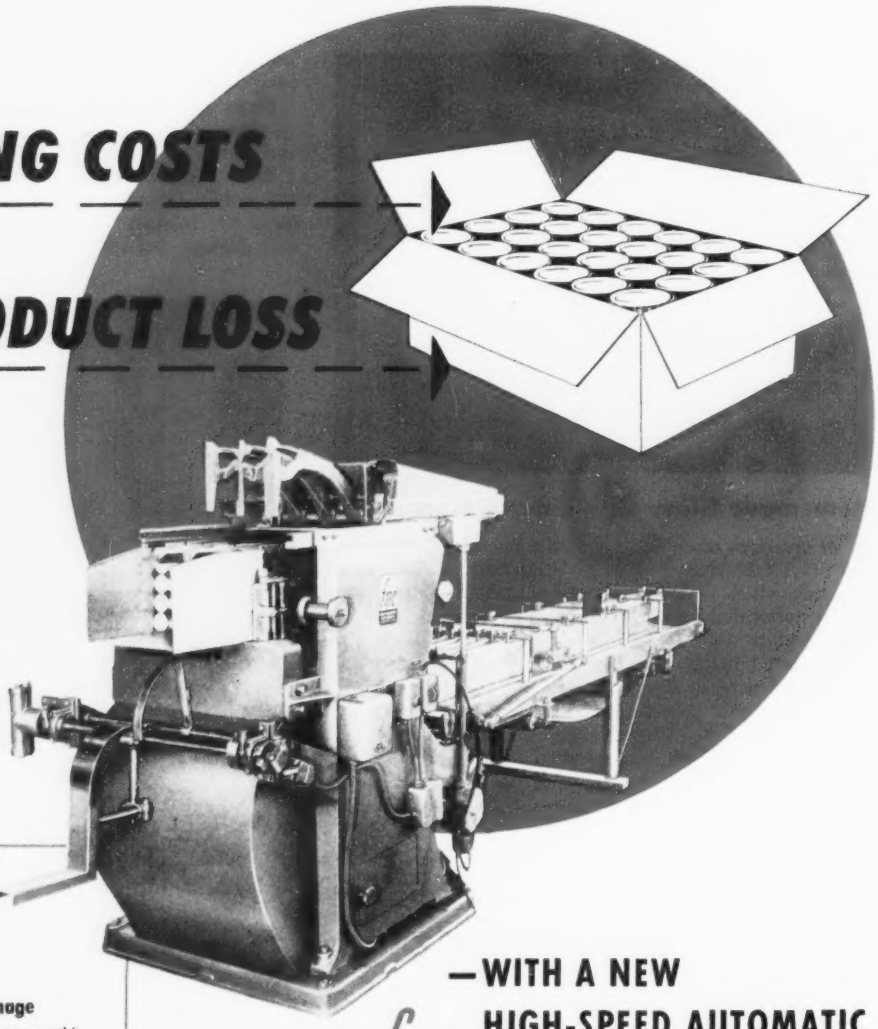
Glass Pipe Solves Shortage Problem

During the period when high-nickel-content stainless-steel pipe was practically unobtainable, Umatilla Canning Co., Milton-Freewater, Oregon, with excellent results, replaced conventional pipe with 2-in. glass lines, the latter protected by wood housing.

Two conditions complicated the situation. One was

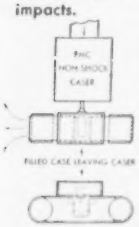
CUT CASING COSTS

STOP PRODUCT LOSS



Bead-to-Bead Contact Eliminates Can Dents and Damage

Cans enter the machine upright, move smoothly along woven wire belt, and are gently transferred to the case. No rolling—no damaging impacts.



Flexible Take-away Conveyor

Choice of take-away in any direction from the caser, for most efficient flow-line.

Get the FACTS Today!

New descriptive Non-Shock Caser bulletin gives full information. Write for your copy, or call your nearest FMC representative.

—WITH A NEW fmc HIGH-SPEED AUTOMATIC NON-SHOCK CASER

The model 3 FMC Non-Shock Caser introduces a *completely new method* of casing cans. It is specially designed to cut casing costs through automatic, high-speed operation. Operator simply slips case over the chute—*the caser does the rest*, at speeds up to 1200 cases per hour! Damaging impact to cans, labels and tender products is completely eliminated. Even with its unmatched capacity, this machine moves individual cans slowly and gently, with contact limited to the beads. These compact, flexible machines handle all can sizes up to 301 diameter in 4 x 6 packs, and up to 603 diameter in 3 x 4 packs. Get the facts today on this *performance proved* FMC Caser. For a machine of lower capacity, inquire about the FMC-Kyler Caser line.

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

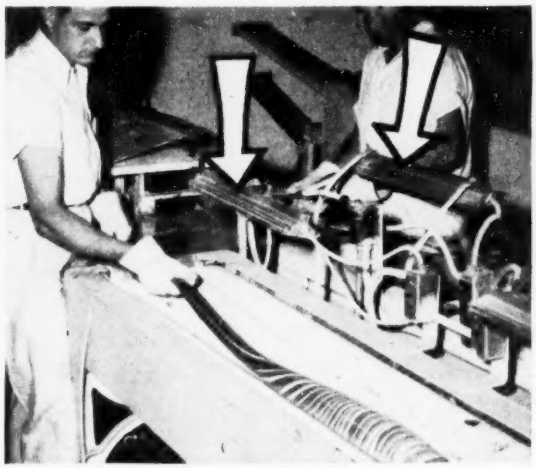
General Sales Offices:

WESTERN: SAN JOSE 6, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

For more information, use coupon on page 157.

the liquid to be transported, a highly corrosion salt-sugar brine. The other was the distance of travel, a gravity flow of 180 ft. from the logical brine-tank location to the filling machines. Eliminated, because of the corrosion action of the liquid, were all metals except scarce high nickel stainless.

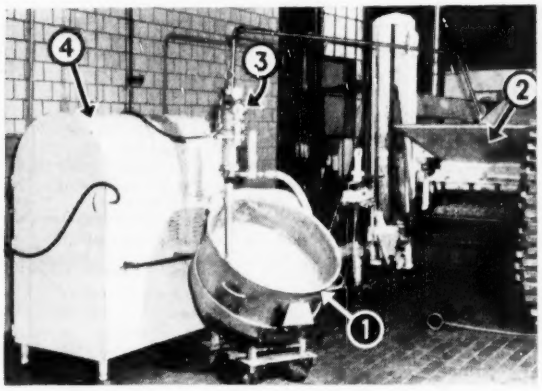
Tests, after glass pipe—(A) in photo—was installed, indicated greater clarity of brine in finished product than when conventional pipe had been used. Any breakage or damage to the glass pipe line was prevented by enclosing the line in a wood housing (B).—*F.E. Staff*



Wired Heat Aids Hard Candy Making

Maintaining uniform diameter during hard candy drawing, and elimination of chipping was accomplished by installation of an electric heating unit (see photo) to keep candy mass plastic.

Replacing steam pipe or gas flame by electric heater at drawing station has several advantages. Heat distribution is flexible and temperature is readily controlled. Also sanitation is improved as is operator safety.—*F. E. Staff.*

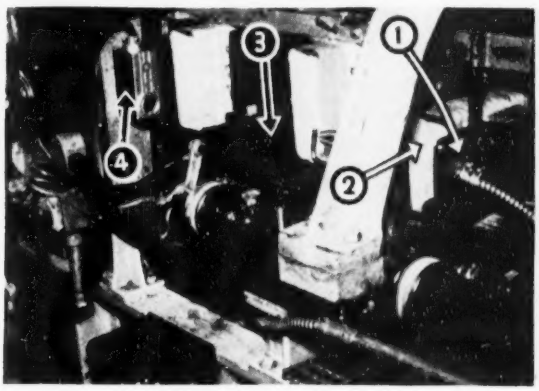


Batter Pump Ups Oven Output

Full capacity of our ovens is assured now that we transfer batter from our continuous mixer to the oven dispenser by pump instead of hoist and over-head tram. Labor involved is now less, space requirements have been reduced and our plant's oven operation is no longer intermittent.

Formerly, the 300 qt.-bowls—(1) in photo—were lifted by hoist, pushed to depositing machine hopper (2) and there dumped by hand. Between these hand replenishing operations, which required the time of two men, oven ran partially empty. Total lost oven capacity during a 10-12 hr. day was excessive.

Then, a double acting pump (3) was installed to transfer batter uninterrupted from continuous mixer (4) to depositor. As one bowl is emptied by pump, another is filled from the mixer. Transferring pump from an empty bowl to a full one does not interrupt depositing operation. Therefore, oven now runs at full capacity.—*C. D. Grennan, Jersey Farm Baking Co., Chicago.*



Indexing of Overwrap Controlled

Correct lengthwise alignment of printed-overwrap with carton, on cereal packaging lines at General Foods Corp., Battle Creek, Michigan, was not assured until an electric-eye indexing control was installed.

Beam sender—(1) in photo—is placed immediately behind location where carton (2) is pushed up to sealing

$50 Extra for Best Item

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month, you will get an additional payment of $50.

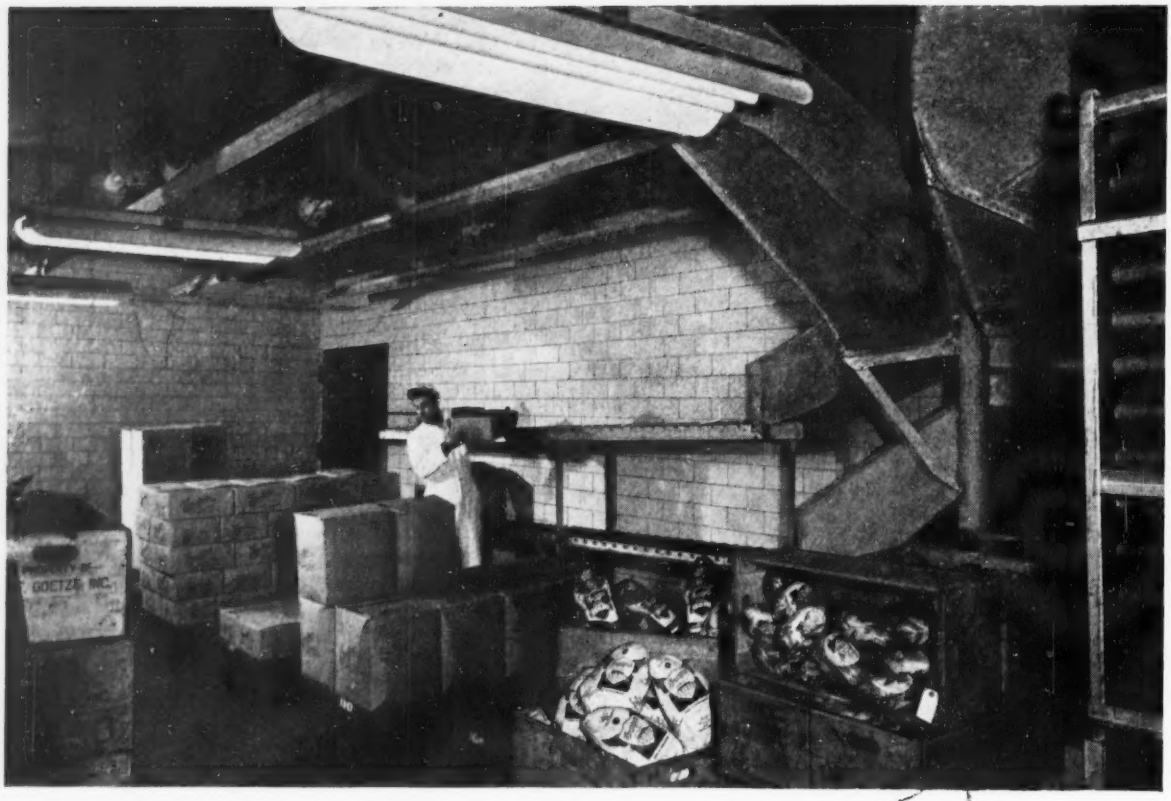
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

JUNE PRACTICAL IDEA winner was "Turns Product for Better Inspection," which was submitted by Walter Blevins, Plant Superintendent, Brandywine Mushroom Corp., West Chester, Pa. Described was a simple angle-iron and belt-strip device that contacts and thus rotates rollers of a conveyor carrying mushrooms, causing turning of the buttons so they can be more thoroughly inspected.



How old is the cork insulation behind this tile wall?

If you are not already familiar with the long life of corkboard insulation you may be surprised to learn how long cork lasts. Here, for example, is a packing station in the order-assembly department of Albert F. Goetze, Inc., meat packing plant in Baltimore, Md. The Armstrong's Corkboard behind the tile is 22 years old.

But there's even more to the story than that. In 1951 this room was converted from a packing floor. And that's when the tile was installed—right over the cork wall that had been erected in 1931.

At the time of the conversion, according to Mr. Albert F. Goetze, Jr., the cork insulation was perfectly dry. There was no bulging or buckling. It was entirely practical to apply the tile directly over the original corkboard wall.

You can always count on long, trouble-free performance when corkboard insulation is installed with careful attention to all the details that might affect service life. This example is but one of many hundreds where cork is still on the job after 20, 30, and even 40 years.

Call in Armstrong whenever you need low-temperature insulation. Our complete contracting service will do the entire job for you—from specification to installation. You'll get a thoroughly professional job, backed by a responsible organization with a reputation for quality work. For more information, call your nearest Armstrong office or write to Armstrong Cork Company, 2008 Seventh Street, Lancaster, Pennsylvania.

☐ 12 YEARS?
☐ 22 YEARS?
☐ 32 YEARS?

Complete Insulation Contract Service

There are many factors that can't be written into an insulation contract, but which can largely determine whether or not the agreement will be entirely satisfactory. They include:

1. Financial responsibility—resources to complete the contract despite any unforeseen events.
2. Integrity—a reputation for quality work and for prompt settlement of any justified complaints.
3. Technical ability — experience, plus technical and research staff to do the job in accordance with best practices.
4. Manpower resources — trained supervisors and workmen able to handle any contract efficiently.
5. Efficiency — ability to deal with problems of accounting, tax provisions, insurance, and workmen's compensation.

You get all these with an Armstrong Contract

ARMSTRONG'S INDUSTRIAL INSULATIONS

For temperatures from 300° below zero to 2800° F.

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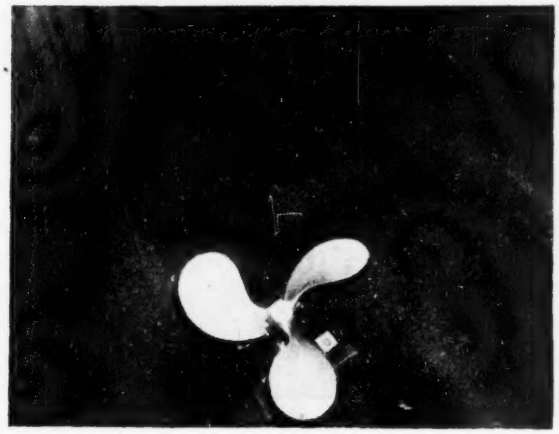
conveyor (5), following first of overwrapping operations. Ends of wrap, extending beyond carton, will be folded over carton-top and bottom and sealed in succeeding operators. If indexing is not accurate, printing will be folded over.

If indexing is accurate, overwrap interrupts the beam from sender, operative only during interval when wrap passes in front of eye.

If former is misaligned, beam registers on receiver (4) which operates alignment correcting controls. Thus printing on overwrap is correctly located on carton surfaces and fold on both ends is ample for tight sealing.—*F E Staff.*



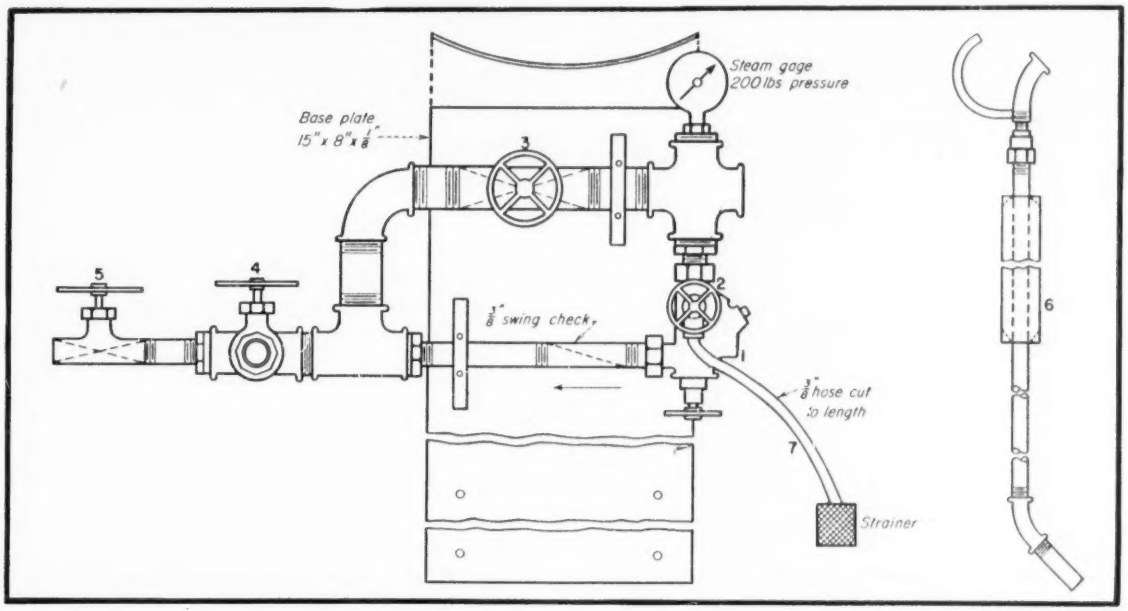
Offset Agitator Improves Mixing

To obtain vigorous agitation necessary in wine starting tanks at Garrett & Co., Brooklyn, large metal propellers were employed. Soon it was learned that these high powered agitators, when centered in tank bottom formed a vortex on surface as soon as props were in motion.

Vortex rapidly assumed whirlpool proportions and, as center was pulled down, liquid rose at tanks circumference overflowing top. It was necessary to start with less liquid in tank or change agitating procedure. Latter expedient was chosen.

Locating propeller off-center (see photo) not only corrected whirlpooling, but improved operation of mixing.

Now, though agitation is so active that many vortices are formed, their duration is short, never reaching whirlpool stage or threatening tank overflow, instead increasing, "folding in" of the liquids.—*F. E. Staff.*



Homemade Steam Cleaner

Pressure cleaning unit we designed and built in our shop at a cost of approximately $35, performs tasks efficiently and economically.

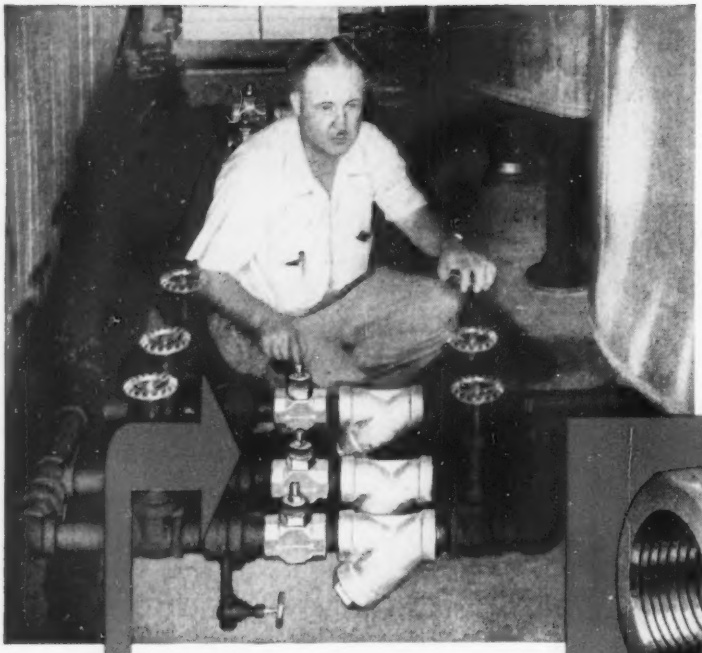
Mounted on a truck or dolly, cleaner can be transported to any location in plant where a steam line is accessable and there connected for use. It may also be attached to a processing unit which it will clean thoroughly in less time and with fewer man-hours than other methods require.

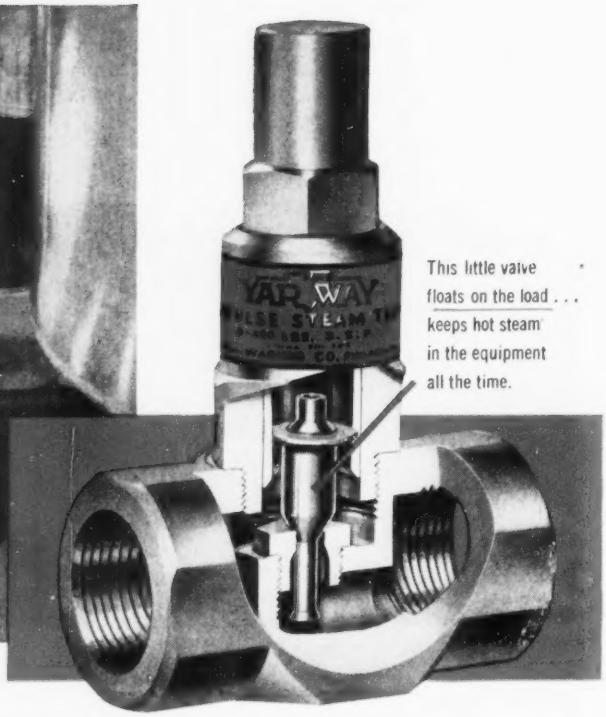
Mixed and proportional in cleaning unit delivered to a nozzle is either a steam-free solution of soap of either cleaning or paint-stripping type, or a steam-solution mixture. We have used cleaning assembly for pressure dispensing of quaternary ammonia compounds, phosphatizing solutions, detergents and deoderizers, all equally satisfactory results.

This is how pressure unit is constructed and how it can be operated:

To a 00-2.1, $\frac{3}{8}$ in. Pemberthy overflow valve—(1) in sketch—is attached a $\frac{3}{8}$ in. solution-control angle-valve (2). Former admits steam to form a mist of solution, volume of which admitted to system is regulated by latter mentioned valve. Main steam flow which by-passes mixing-proportioning valves, is controlled by a 1 in. globe valve (3). Two valves, (4&5) $\frac{1}{2}$ in. each control discharge to steam gun (6).

Operation of unit starts with a hose (7) from angle valve (2) inserted in a drum of solution to be used in cleaning. Latter should be no hotter than 100 deg. F. Then valves 3, 2, 4 and 5 are opened in the order





This little valve floats on the load . . . keeps hot steam in the equipment all the time.

THESE STEAM TRAPS GIVE FASTER HEAT-UP ON TOMATO COOKERS

PLUS 5 EXTRA BATCHES PER DAY!

RIPE tomatoes can't wait and they don't have to at the P.M.C. Canning Company, Swedesboro, New Jersey.

The owner of this large tomato and pizza sauce cannery found that by switching to YARWAY Impulse Steam Traps on his 1500 gallon cooking kettles, he was able to speed up the heat-up period enough to give *5 to 6 extra batches per day*. In addition, only with YARWAYS could high boiling temperatures be obtained quickly enough for proper pizza sauce processing.

That's because the little stainless steel valve (the only moving part in a YARWAY trap) opens wide when steam is turned on and discharges air and condensate *continuously* until production temperature is reached. After that, by a pulsating action, each tiny bit of condensate is discharged as it forms—maintaining steady, maximum temperature in the equipment.

This makes for profitable steam trapping. So do these other YARWAY advantages—low initial cost, low maintenance, stainless steel construction, easy close-quarter installation, quick availability from more than 200 local industrial distributors.

Try a YARWAY Impulse Trap FREE for 60 days in your plant. It's the best test. Your distributor will supply the trap. For his name, write . . .

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

YAR-WAY

the steam trap designed with more production in mind

For more information, use coupon on page 157.

named, steam from plant line admitted to unit between opening valves 4 and 5. Optinum steam pressure is 60 to 80 psi.

If when units is used as a steam cleaner, solution passes the overflow valve, adjustment of the solution control valve (2) corrects the condition.

When it is desirable to discharge a hot solution at nozzle without steam, start with closed globe valve (3), but the remaining valves open. Then slowly open valve from plant steam line.

Stationary unit improves cleaning of wire mesh belts. Install a 1 in. pipe equipped with ¼ in. jet spray nozzles (U-4070 Vee Jet) on 3 in. centers across such a conveyor. We employ this method for cleaning our exhaust-box conveyors, attaching a hose from the pressure unit to each end of spray pipe. Conveyor is cleaned while running without removing belt in less than half the time formerly required.

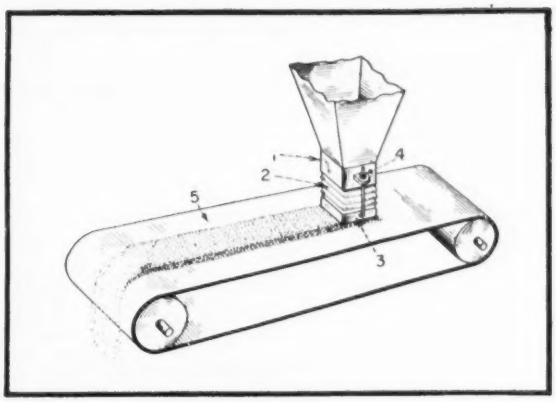
With 15 of these units in operation in our plant we have ample means to check their efficiency. Steam gun can be operated by one man as far as 100 ft. from unit. Method is flexible, economical in use of soap and may be elevated to considerable height without loss of suction.—*Wm. C. Stretton, Van Camp Sea Food Co., Inc., Terminal Island, Calif.*

Ends Refrigerator-Door Freeze-Up

Jamming of refrigerator doors, due to condensed moisture freezing on gaskets, is now avoided at General Ice Cream Corp.'s plant at Albany, N. Y.

Formerly, doors to hardening room—where temperature on one side is −30 and on the other, 68 deg. F.—often froze so tightly that it was only with great difficulty that employees could budge them.

Merely by lining the door frame with electric lead-sheathed heating cables (see photo) was this difficulty eliminated. Now, not only has door freezing ended but fewer gaskets are torn, therefore maintenance costs are lowered and refrigeration losses materially reduced.



Easy-to-Make Solids Proportioner

Using materials normally available in food plants, a volumetric proportioner, which will deliver desired volume of solids with a high degree of accuracy, is readily constructed.

This is how to fabricate unit.

Onto delivery spout of a bin or hopper is added either a round or square collar—(1) in sketch—, with clamping arrangement for attaching canvas sleeve (2).

To lower end of cloth tube a round or flat-sided metal frame (3) is then secured.

By means of turnbuckle or threaded rod-and-nut arrangement (4), metal frame can be raised or lowered to control distance between outlet and belt conveyor (5). Latter should be at least twice width of frame to prevent spillage over sides of belt.

When conveyor is in motion, a uniform layer of solids from hopper will be laid on it, thickness of bed governed by height of frame above belt.

By controlling movement of conveyor with a variable speed drive, an accurately measured volume of material per unit of time will be discharged from end of the belt.—*FE Staff.*

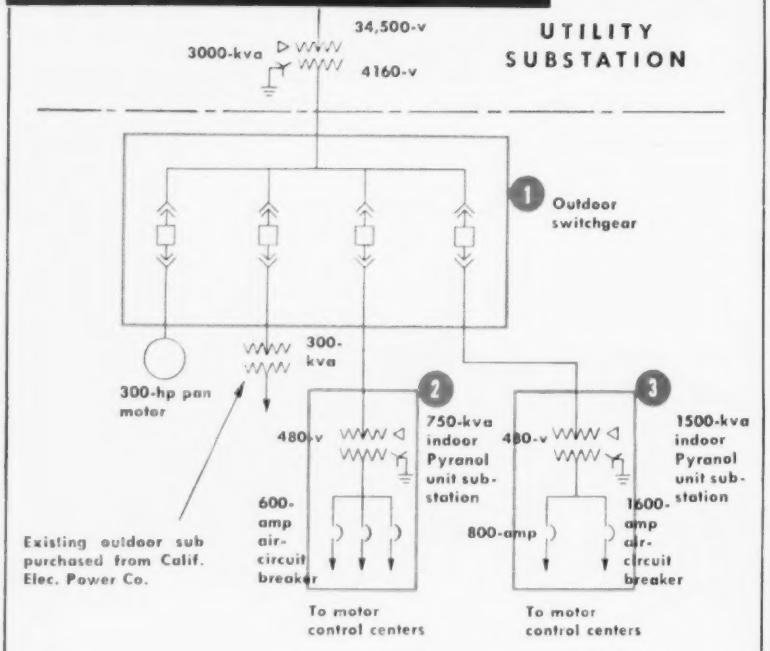
Belt-Side Slide Halves Hand Labor

Merely by adding aluminum sheets which slide out from beneath conveyor belt, Fine Products Co., Augusta, Ga., greatly reduced labor required for transferring enrobed and cooled chocolates from belt to form a layer on cardboard.

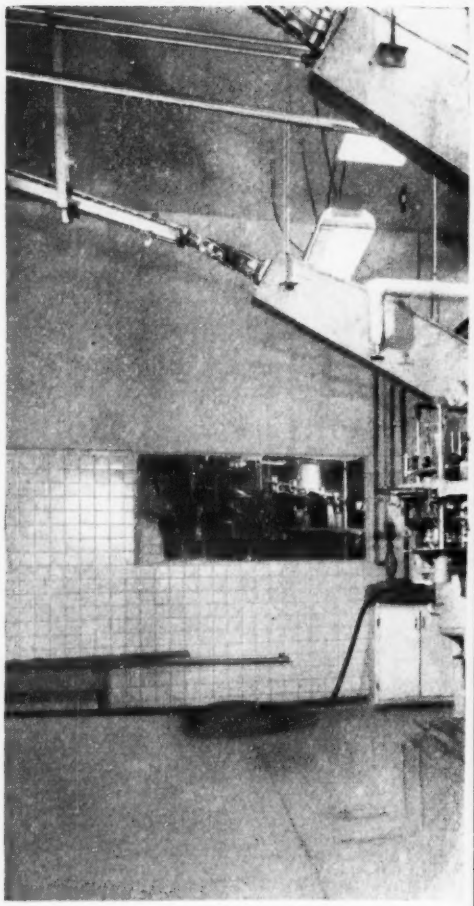
Formerly, each piece of confection was lifted from conveyor by hand and placed on a piece of cardboard in shallow tray. Finger prints on pieces and cracked or crushed surfaces often resulted from handling.

Now, a group of chocolates are scooped off slick surfaced belt by operator's cupped hands (see photo), slid across aluminum strip, and onto cardboard in tray. Not only can one worker now rack off as many chocolates as two did formerly, but fewer pieces are damaged by transfer operation.—*FE Staff.*

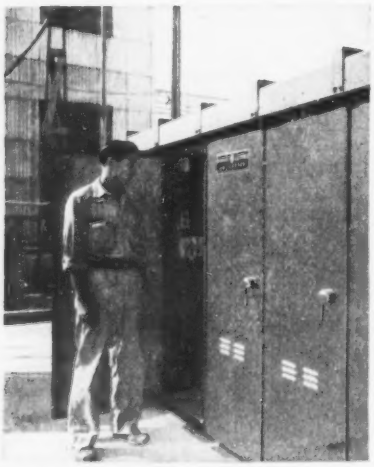
ENGINEERING REPORTS:



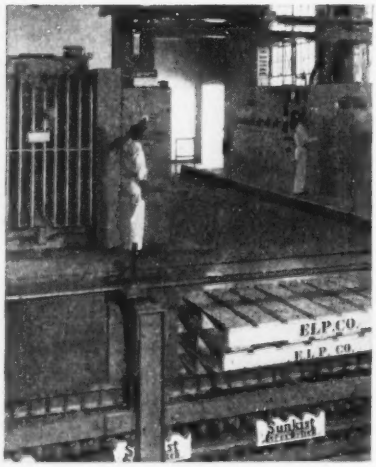
4160- and 480-volt systems neutral grounded to limit possible overvoltages from ground faults



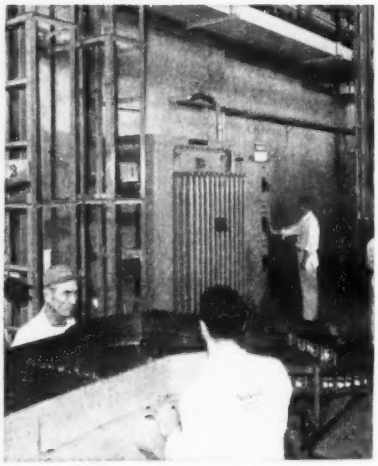
Planned power system makes it easy



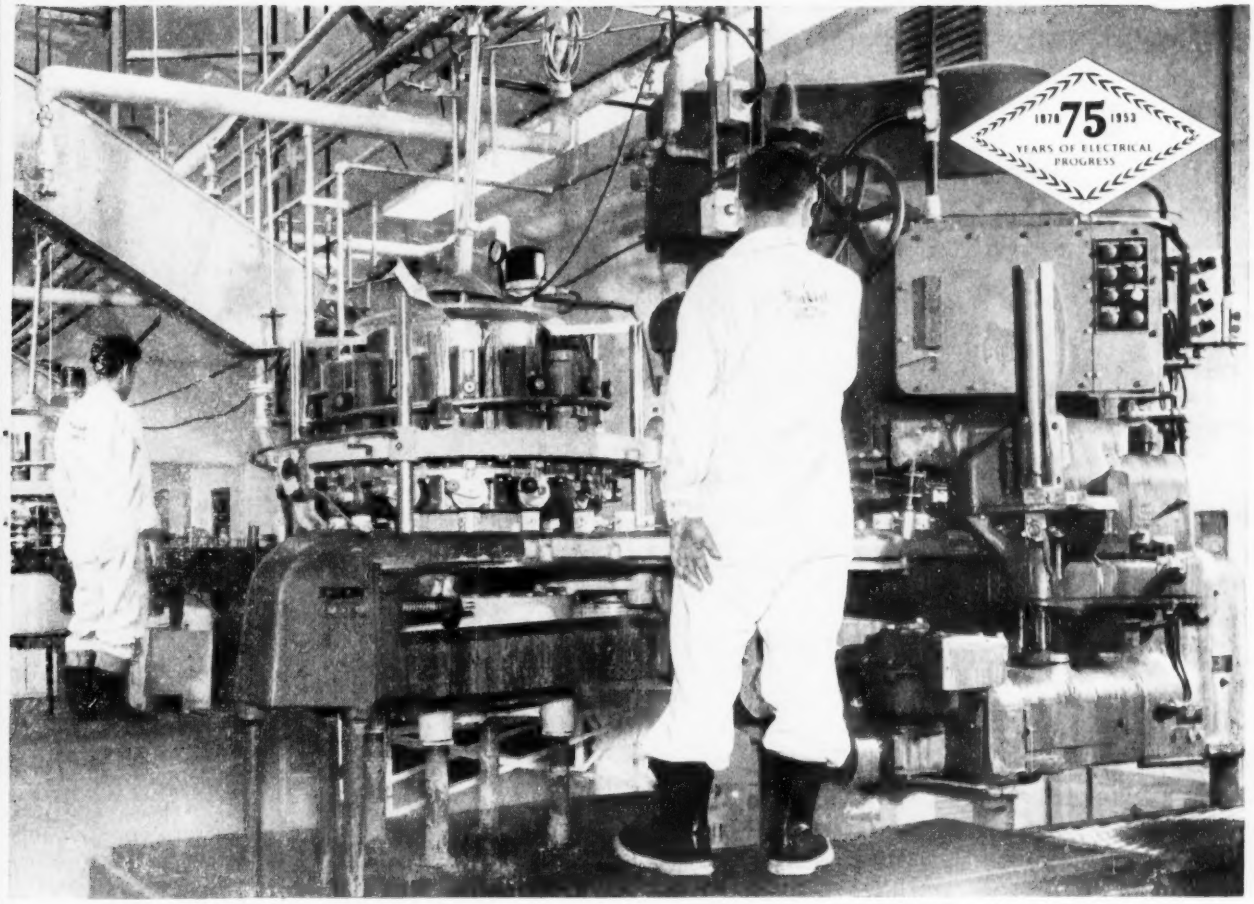
1 Compact, accessible G-E metal clad switch gear distributes high-voltage power to plant. Result: no voltage drop problems, major power savings.



2 750-kva "Building Block" G-E unit substation (background) was easy to install. It was delivered factory-assembled and tested, ready to be set in place.



3 1500-kva unit substation, located near processing line, shortens costly low voltage branch circuits. Drawout circuit breakers simplify maintenance



BETTER PRODUCTION CONTINUITY for these two sealing machines at Exchange Lemon Products results from the full voltage delivered by one of the G-E unit substations. Full voltage at utilization points provides adequate motor starting torque, normal loading without excessive currents, and full illumination for plant lighting.

for juice extraction plant to expand

Exchange Lemon Products Co. lowers expansion costs with G-E radial power distribution system

Thanks to *system planning*, Exchange Lemon Products Company's juice plant at Corona, Calif., can expand steadily and not outgrow its basic electrical system.

At present, this growing affiliate of Sunkist is processing more than 1500 tons of lemons each day. To handle the heavy electrical loads that have developed, Exchange engineers and General Electric Food Industry specialists worked out a co-ordinated low-cost radial distribution system built around G-E load center unit substations. To keep up with future expansion at minimum expense, additional unit substations can be added like building blocks. This has kept investment low by avoiding purchase of unnecessary transformer capacity.

Strategically located throughout the plant, these G-E unit substations play a key part in keeping the length of costly low voltage feeders to a minimum and reducing the short circuit interrupting duty on feeder breakers while delivering full voltage all along the line. High voltage lines that supply the substations can be extended as the plant grows to tie in additional load centers. The need to run individual feeders all the way back to incoming power can be avoided.

If power loads in your plant are increasing, you probably stand to profit by planning a new power system. Talk it over with your G-E Apparatus Sales Representative – find out how step-by-step modernization with G-E load center substations can spread out costs, prevent production interference. General Electric Company, Schenectady 5, New York. 652-14

Engineered Electrical Systems for Food Plants

GENERAL ELECTRIC

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OPEN THE DOOR...

to more frozen food sales with HURON MSG!

● Things happen when you add Huron MSG to foods before freezing—things important to you as a food processor and attractive to frozen food buyers.

Naturally, you can expect enhanced pure food flavors from Huron MSG, America's original monosodium glutamate made from wheat protein. But you also get unexpected bonuses: retention of original taste and quality levels far beyond usual storage periods, and improved color and texture. Such as:

FISH . . . salmon, shrimp, mackerel, haddock and rose fish gain in flavor and all-around palatability. In many cases their original color remains true throughout storage.

MEAT . . . beef, pork sausage, bacon and ham acquire heightened flavor, retain their prefreezing quality longer.

POULTRY . . . all fowl have improved flavor and added juiciness, as well as lengthened storage life.

VEGETABLES . . . most vegetables are given a new full sweetness of flavor. Green vegetables retain color throughout storage and in cooking.

Our Technical Service Department will be glad to furnish you with the cold facts about the best way of using Huron MSG to make your frozen foods taste better, last longer in storage—*and sell faster.* Write or phone—no obligation, of course.

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Pure Monosodium Glutamate 99+%

THE FIRST MSG . . . AND THE FINEST!

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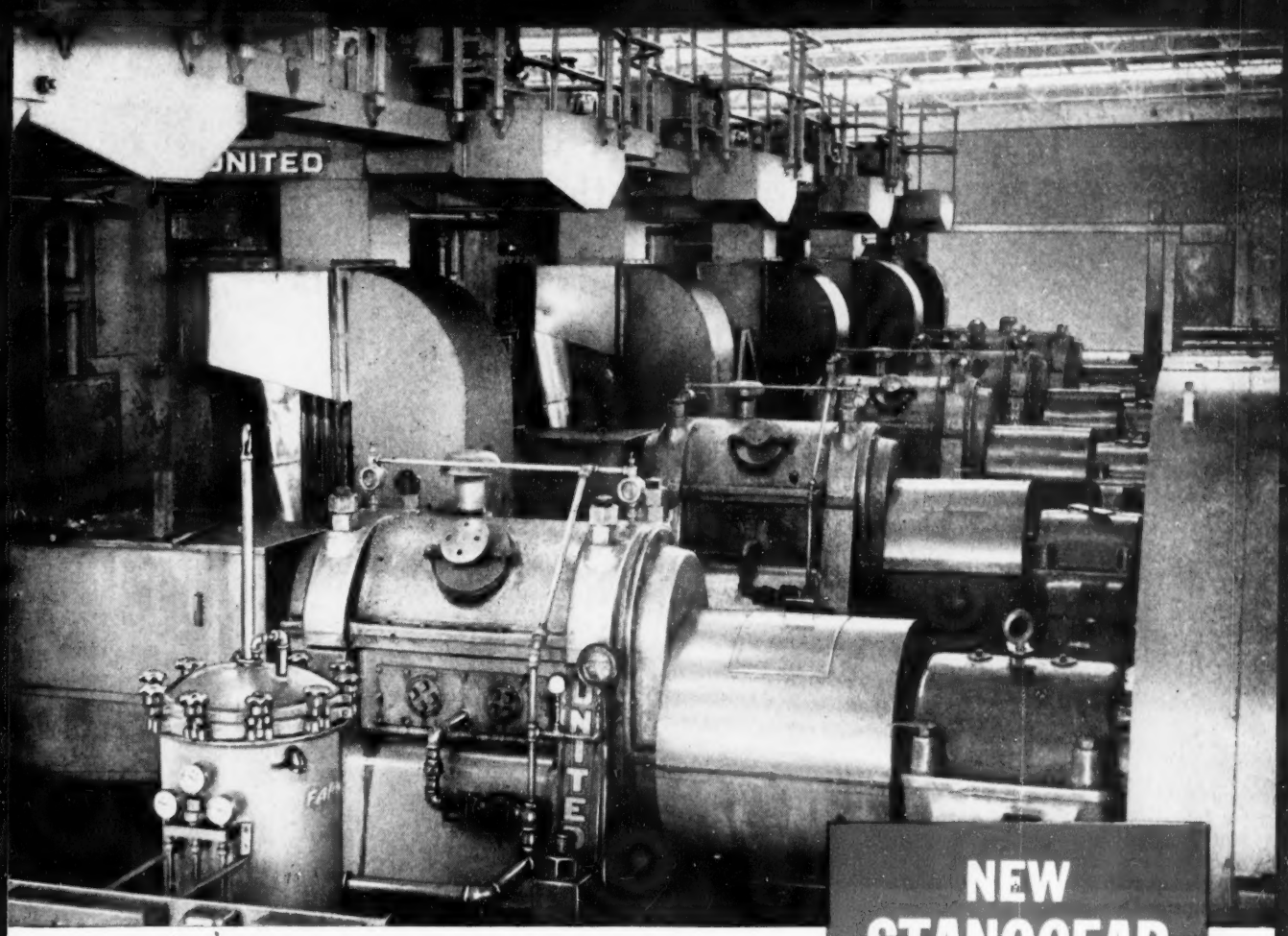


NEW STANOGEAR REG. U.S. PAT. OFF. **Compounds**

NOW . . . 7 ways better for extreme-pressure lubrication . . .

New and improved STANOGEAR Compounds have been developed to meet the requirements of an increasing variety of tougher extreme-pressure lubricating jobs found throughout industry, today. The result of several years of special research and field test work, these outstanding products have proved in actual service their ability to provide these important advantages:

1. Higher load carrying capacity. Use of improved extreme-pressure additives in STANOGEAR Compounds provide a greater anti-weld property. This results in the higher load carrying capacity which these products have demonstrated in actual service.

2. Superior retention of load carrying capacity. In service tests, STANOGEAR Compounds have proved superior to conventional extreme-pressure lubricants in ability to maintain a high load carrying capacity over extended periods of service.

3. Freedom from objectionable deposits. Appropriate base stocks and additives give STANOGEAR Compounds a high resistance to oxidation, thus minimize the formation of deposits.

4. Excellent storage stability. STANOGEAR Compounds contain compounding ingredients which assure excellent stability both in service and storage.

5. Good water separation. STANOGEAR Compounds have demonstrated their superiority to ordinary extreme-pressure lubricants in ability to provide good water separation.

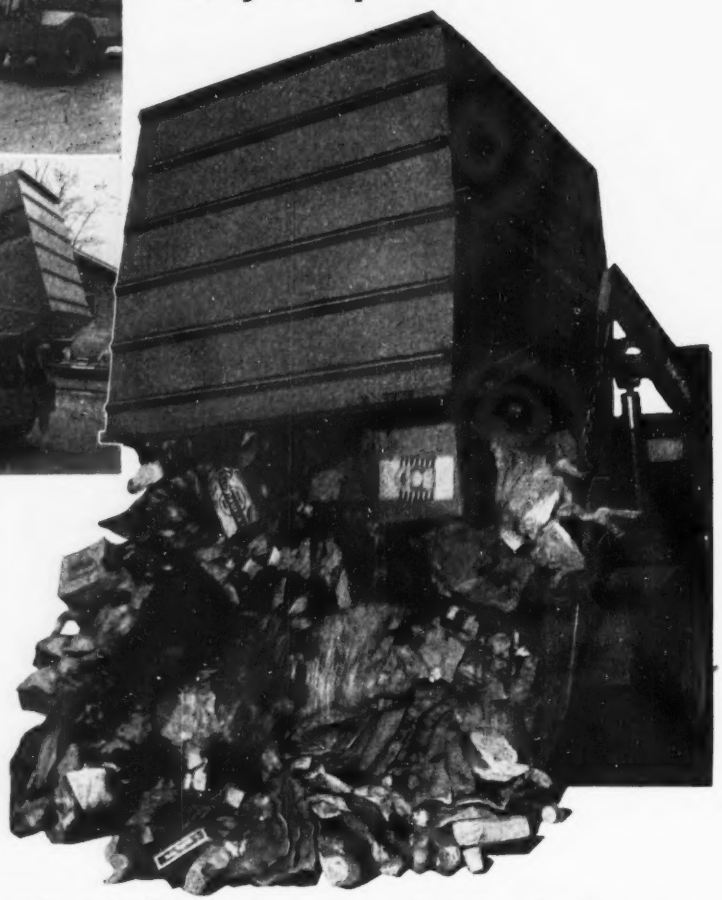
6. Anti-foaming. Under adverse operating conditions, the anti-foam agent in STANOGEAR Compounds has prevented foaming troubles.

7. Versatility. A unique combination of additives in STANOGEAR Compounds equips these products for various industrial gear applications where extreme-pressure lubricating properties are necessary. To meet varying viscosity requirements, STANOGEAR Compounds are available in eight viscosity grades.

The Standard lubrication specialist in your area of the Midwest will be glad to give you more information about the new STANOGEAR Compounds. You need only phone your local Standard Oil office. Or write: Standard Oil Co., 910 South Michigan Avenue, Chicago 80, Illinois

STANDARD OIL COMPANY STANDARD *(Indiana)*

Rubbish Disposal is only ONE of the Cost Cutting jobs for the Dempster-Dumpster in your plant...



It's amazing, almost to the point of fantasy, yet so soundly real, what the minds of men in all types of industry have cooked up for more efficiency and reduced costs with the Dempster-Dumpster.

Hundreds of plants are handling materials of practically every description with one truck-mounted Dempster-Dumpster serving scores of detachable containers. Here are just a few. Oils, gases, and liquids handled in our Tank Type Containers . . . tools and equipment in our Tool Shed Type Container . . . containers on casters placed for receiving steel chips from lathes or at conveyors for receiving finished products . . . container with doors and windows, replacing shacks for plant guards or nightwatchmen . . . containers built to handle chlorinator ash residue of approximately 1500° F. and there are dozens more.

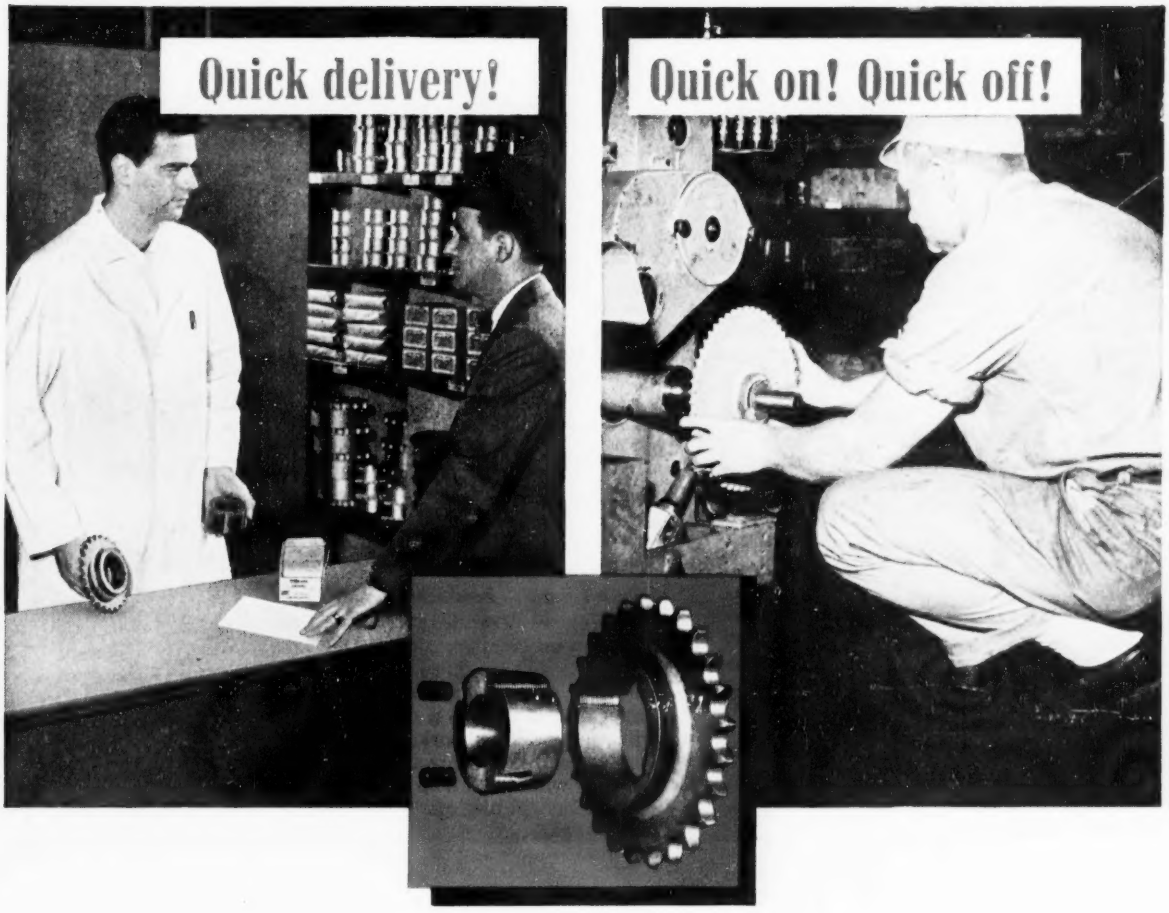
Containers are placed wherever material accumulates. When loaded each is picked-up, hauled and emptied (as illustrated above) . . . or load set down intact. The entire operation is handled by only one man, the driver, by hydraulic controls in cab.

The containers are built in capacities up to 12 cu. yds. and each is designed to suit the materials to be handled—be they bulky, light or heavy . . . solids, liquids or dust.

One Dempster-Dumpster, with driver, does the work of 3 to 5 conventional trucks . . . eliminates trucks and crews standing idle . . . eliminates rehandling of materials and increases efficiency and good plantkeeping.

If you have even any remote idea that this equipment could be adapted to your operation, by all means contact us because being without the Dempster-Dumpster System could easily be costing your company thousands of dollars annually. Manufactured and sold exclusively by Dempster Brothers, Inc.

DEMPSTER BROTHERS, 783 Shea Bldg., Knoxville 17, Tennessee

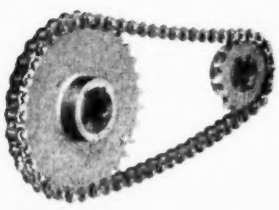


Link-Belt roller chain sprockets with taper lock bushings

HERE'S great news for users of roller chain drives! With the new Link-Belt taper lock sprocket, you don't have to fit the sprocket to the shaft. These sprockets with their taper lock bushings give you the equivalent of a shrink-fit on all standard shaft sizes.

Installation and removal are fast, simple. Set screws force and hold bushing in tapered bore of sprocket, *clamp* it tightly onto shaft. The *full length* of the bushing supports the sprocket on the shaft. Turning set screws in removal holes quickly releases it from shaft.

What's more, it's no longer necessary to wait while wheels are rebored. You can pick these sprockets right off the shelf at your nearby Link-Belt distributor or factory branch store. Available now are sizes for ½, ⅝, ¾, 1 and 1¼-in., single-width chains with other sizes to be announced. Ask for Bulletin 2449.



AN IDEAL COMBINATION:
LINK-BELT PRECISION STEEL ROLLER CHAIN & LINK-BELT SPROCKETS

LINK-BELT

ROLLER CHAIN AND SPROCKETS

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle; Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 19.291

For more information, use coupon on page 157.

Application engineering . . . *essential to control*

No matter what the product, every plant uses methods, materials and equipment that present problems peculiar to its own production. Specifications . . . size of plant . . . rate of output . . . all impose further unique restrictions.

What, then, about process control instrumentation? To do its job right, it has to be designed with all those factors . . . and many others . . . in mind. And here is where Honeywell Application Engineering steps in.

First comes a thorough investigation of control requirements. A Honeywell engineering representative, well versed in instrumentation techniques sits down with process engineers, production men, and instrument technicians . . . discusses details of the specific process. Then he puts the problem up to Honeywell's staff of application engineers.

Specialists for Each Industry

In this group are men who are expert in each specific industry. One group, for example, specializes in instrumentation for the metalworking industry . . . another for chemical . . . another for petroleum . . . until the whole gamut of modern manufacturing is represented. Each man has been trained, by education and first-hand experience, in the techniques of processing and process control in the area of his interest. Each is a living part of the industry he serves. And he knows why and where every process "is different."

Covers All Aspects of Control

Honeywell application engineering covers the entire control installation. It works out details of what instrument to use for each measurement or control function . . . what type of primary element . . . what control system . . . what size and style of valve. It provides all essential signals, safety interlocks, and accessories. It combines all these elements into a complete unit, arranged for peak production efficiency . . . greatest convenience of the operator, and for maximum ease of service . . . custom-fitted to the individual needs of the process to be controlled.

Saves Time . . . Produces Top Performance

This Honeywell service gives specialized consultation on complex control problems that would otherwise require the attention of experts in the individual plant. But most important, it assures a control system that will produce the superior performance that Honeywell instruments are capable of giving . . . and which will help to obtain the most production and best quality from the process which it serves.

Modern dairies *for safe,*

SOUND PLANNING, *based on specialized engineering experience, forms the basis of Honeywell Application Engineering. Here a round-table discussion between customer and Honeywell technicians irons out the initial control requirements for a process.*

125,000 QUARTS OF MILK PER DAY *receive accurate HTST pasteurizing under control of these* ***ElectroniK*** *instruments, in the plant of Lehigh Valley Cooperative Farmers.*

choose Honeywell control *efficient* HTST *pasteurizing*

Like many other leading dairies, the Lehigh Valley Cooperative Farmers, Allentown, Pa. utilizes short-time pasteurizing as the sanitary, high-production way to process milk. And in this modern plant Honeywell engineered instrumentation maintains precise, automatic control of the pasteurizing equipment.

Most critical phase of the operation is maintenance of correct pasteurizing temperatures. An *ElectroniK* Thermal Limit Controller does this job... instantly calls for diversion of milk if the temperature falls below 161° F. To complete the control of the process, additional *ElectroniK* instruments regulate temperatures of hot water, and record temperature of milk in the cooler.

A vital element of the system is the Honeywell *Flo-Guard* diversion valve. Its simplified construction cuts clean-up time to a minimum . . . prevents incorrect assembly after cleaning.

Engineered as a unit for the individual pasteurizing set-up, Honeywell HTST Control incorporates every feature for simple, efficient operation. Its rugged construction and unit design assure continuous duty . . . simplify maintenance.

Your local Honeywell engineering representative will be glad to discuss how this control can be applied in your plant. Call him today . . . he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division,* 4502 Wayne Ave., Philadelphia 44, Pa.

● **REFERENCE DATA: Write for Data Sheet No. 3.4-6, "HTST Control System."**

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

Nash Instrument Air Compressors deliver only clean air, free from oil or dust, and without filters

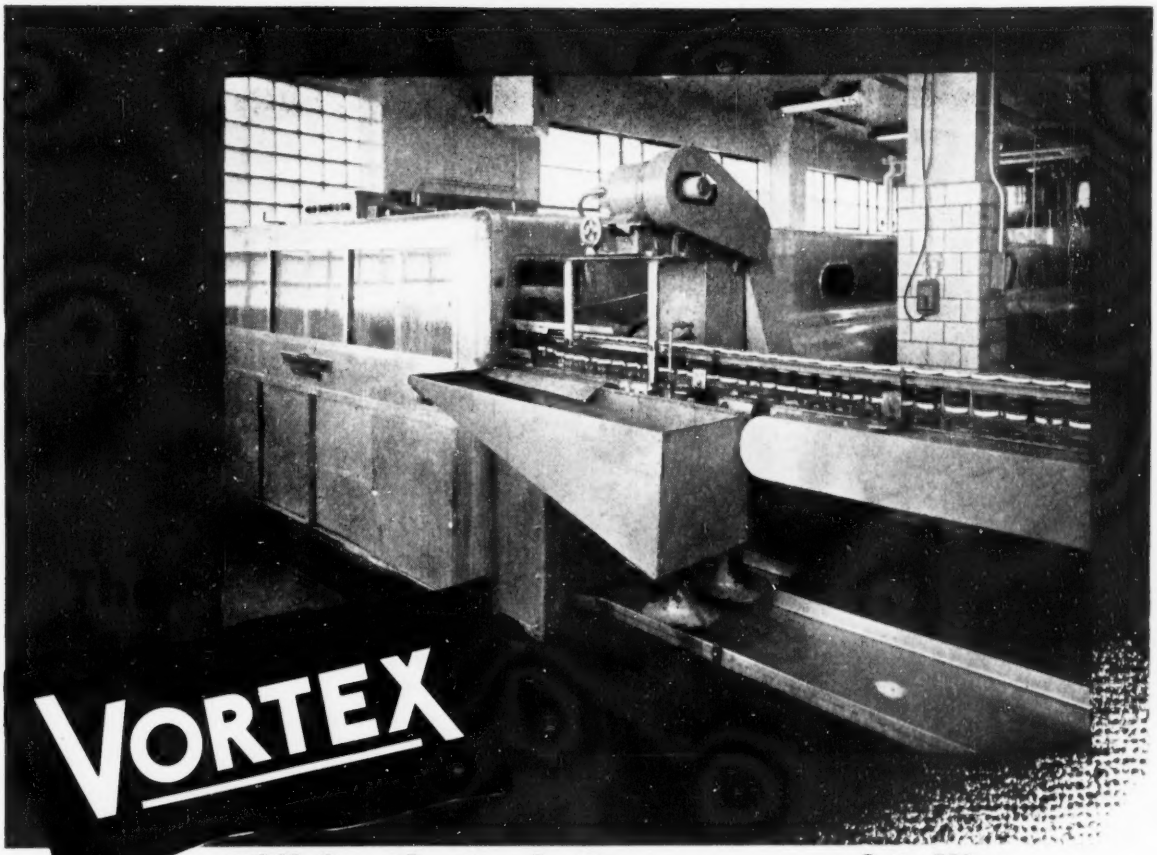
Here is Why!

You can dispense with oil filters and dust filters when you install ®Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

- No oil filters.
- No dust filters.
- No internal lubrication to contaminate air handled.
- No internal wearing parts.
- No valves, pistons, or vanes.
- Non-pulsating pressure.
- Original performance constant over a long pump life.
- Low maintenance cost.

NASH ENGINEERING COMPANY
395 WILSON, SO. NORWALK, CONN.



Efficiently Cools Preserves and Jellies

for BLUE PLATE FOODS, Inc.

As in many other installations throughout the food industry, the Barry-Wehmiller "Vortex" processor is used to cool preserves and jellies in the New Orleans plant of Blue Plate Foods, Inc. Whether used as a cooler, freezer, pasteurizer or exhaust box, this versatile machine has thoroughly proven its ability to speed up production, assure highest quality of product, with extremely low maintenance and operating expense.

The famous, time-proven Barry-Wehmiller engineering refinements include the "walking-beam" conveyor, atomized spray system of heat transfer and low power hydraulic drive. The automatic, continuous operation of the "Vortex" is cutting food processing costs in a wide variety of applications throughout your industry.

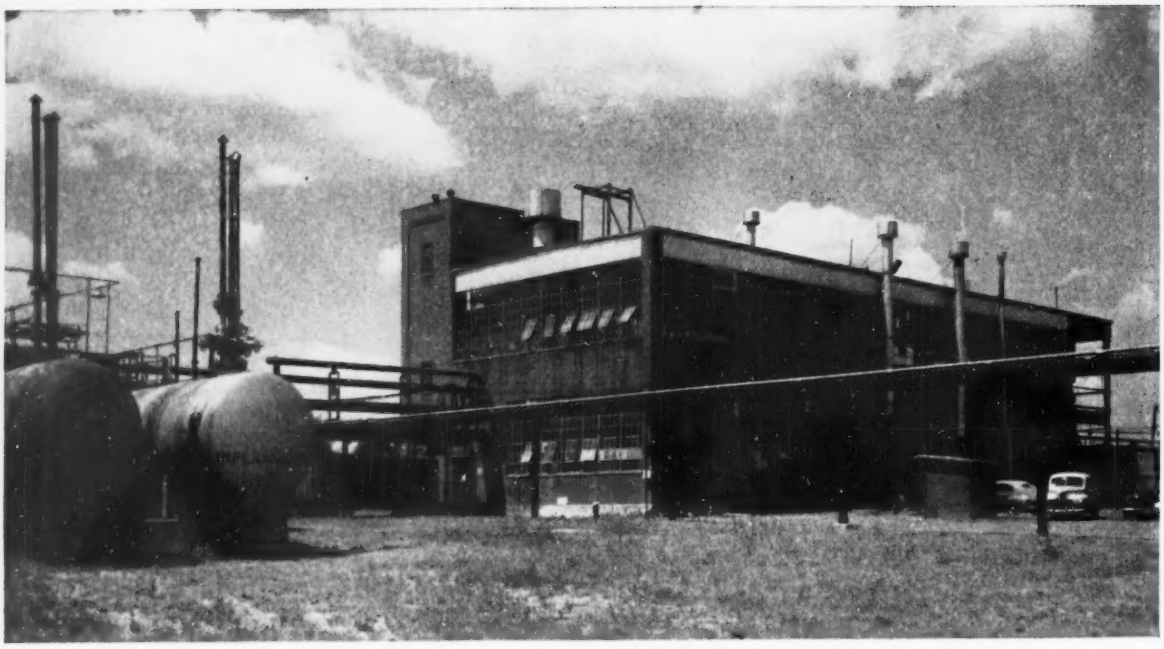
For complete information on the Barry-Wehmiller "Vortex" and its many processing uses, write for bulletins and outline your requirements today.

BARRY-WEHMILLER MACHINERY CO.

4660 WEST FLORISSANT AVENUE · ST. LOUIS 15, MO.

For more information, use coupon on page 157.

Oh, I see



. . . they're using

our valves at

GOODYEAR

The Goodyear Chemigum Plant at Akron relies on perfect valve functioning . . . precise flow control with valves that are dependable, just as you may. Their choice throughout this plant is OIC.

You pay no extras for OIC's precision engineering, even though you do get longer, trouble-free valve service. In addition, OIC offers you engineering assistance to help you select valves best suited for the job.

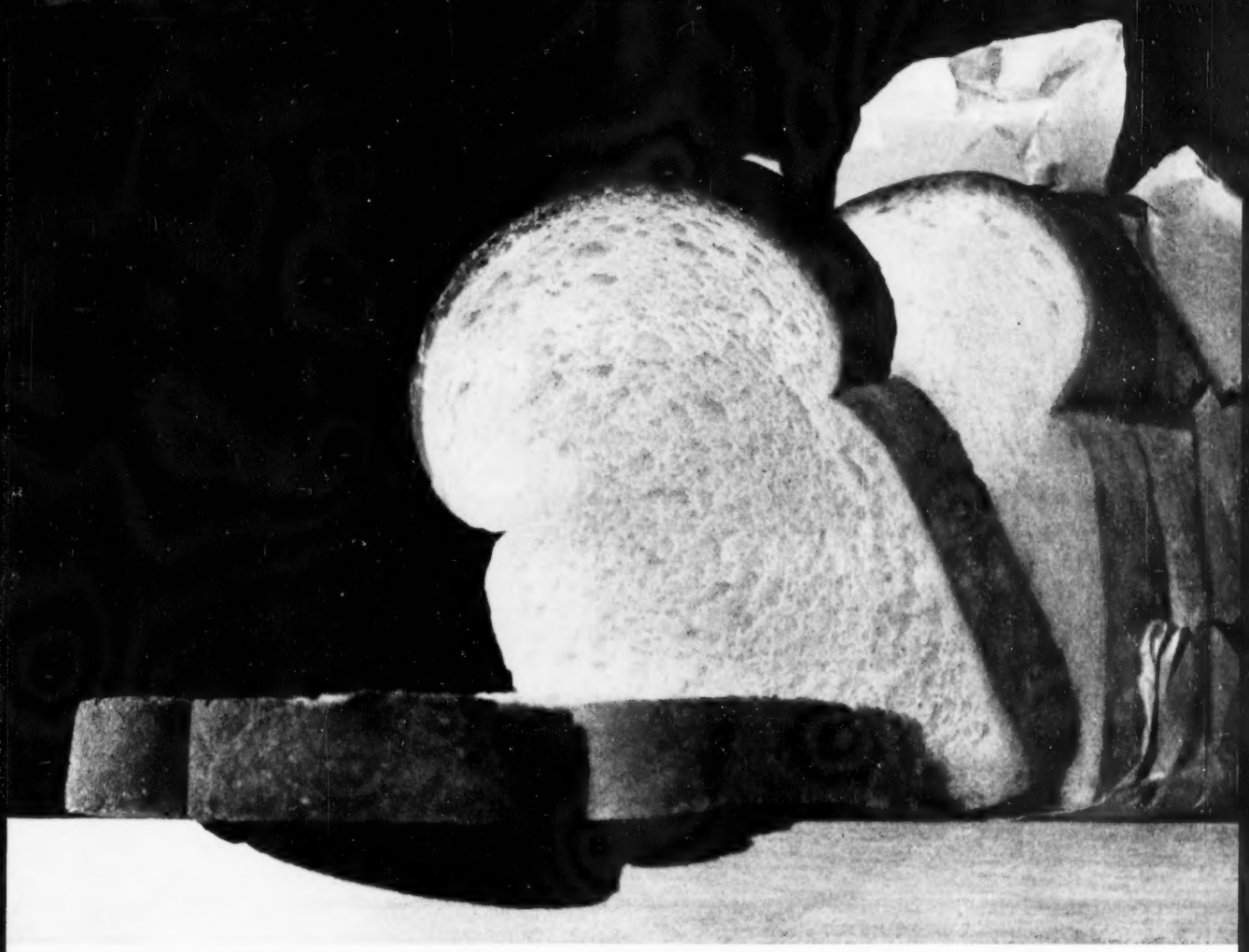
If you could see them made, you'd make OIC Valves your first choice when you want dependability.

THE OHIO INJECTOR COMPANY • WADSWORTH, OHIO

OIC FOUNDED 1893

VALVES | **FORGED & CAST STEEL, IRON & BRONZE, LUBRICATED PLUG VALVES**

For more information, use coupon on page 157.



Do you know about **Myvatex Food Emulsifier?**

Some of the best-selling bread brands in the land now carry 6 to 8 ounces of it as part of the shortening for each 100 pounds of flour. It has a favorable effect on the tenderness, volume, grain, and crumb structure of bread.

It's a 50-50 mixture of prime lard homogenized with Myverol Distilled Monoglyceride, which is not just an additive but a nutritious food itself, derived from natural fats—a concentrated monoglyceride, as specifically permitted by the new Federal Bread Standard. And Myvatex Food Emulsifier has the plastic consistency you require for easy "scaling" and complete incorporation at the mixer.

Why not become familiar with the way this wholesome and effective shortening component acts in your own product? Tell us how big a sample you need for a good shop test. ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York and Chicago • W. M. Gillies and Company, Los Angeles and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

"Myvatex" and "Myverol" are trade-marks

distillers of monoglycerides from natural fats and oils

DPi

Also . . . vitamins A and E

Distillation Products Industries *is a division of* **Eastman Kodak Company**

One hose handles them all!

VERSICON, Thermoid's versatile, all-purpose hose, handles virtually any type of gas or liquid . . . makes stocks of many different types of hose unnecessary. You save through reduced inventories, simplified buying and less storage space. Losses from end remnants are greatly reduced.

VERSICON Hose is built to last. Synthetic oil-proof tube is reinforced with braided, high-tensile rayon. Tough oil-proof cover resists weather and abrasion.

For quick, easy identification, VERSICON has a brown cover. It's available in sizes from $\frac{3}{16}$" to $1\frac{1}{2}$" in lengths to fit your requirements.

In addition to various kinds of multi-purpose hose, Thermoid makes hose for certain specific applications, such as paint spray, suction, creamery, etc. Call your Thermoid Distributor. He can supply you with the Thermoid Hose best suited for your requirements. Or write direct for Catalog No. 3680.

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

For more information, use coupon on page 157.

Compare { performance value *price*

New International R-160 Series. Conventional and cab forward types. Gasoline or LPG power. GVW ratings, 14,000 to 17,000 lbs. Famous Comfo-Vision cab.

NOW—new low prices on light, medium, and light-heavy duty models

Compare performance. Compare the proved performance of Internationals, model for model, with any truck on the road. Prove to yourself that Internationals are today's top truck buy.

Compare value. Compare the extra value in Internationals, detail by detail, with any comparable model. Compare the low operating cost. Compare the low maintenance cost, the long life. Compare the job specialization that's possible with Internationals. You will find that Internationals are *your* best buy.

Compare price. *Every* new International, with its unmatched performance and unmatched value, compares favorably in price with any other truck. Ask about new low prices. See your International Dealer or Branch *today.*

America's Most Complete Truck Line

168 basic models from ½-ton pickups to 90,000 lbs. GVW off-highway models . . . 307 new features in the new R-line . . . 29 engines available with widest practical choice of gasoline, LPG, or diesel power . . . 296 wheelbases . . . wide selection of body types and styles . . . thousands of variations for exact job specialization.

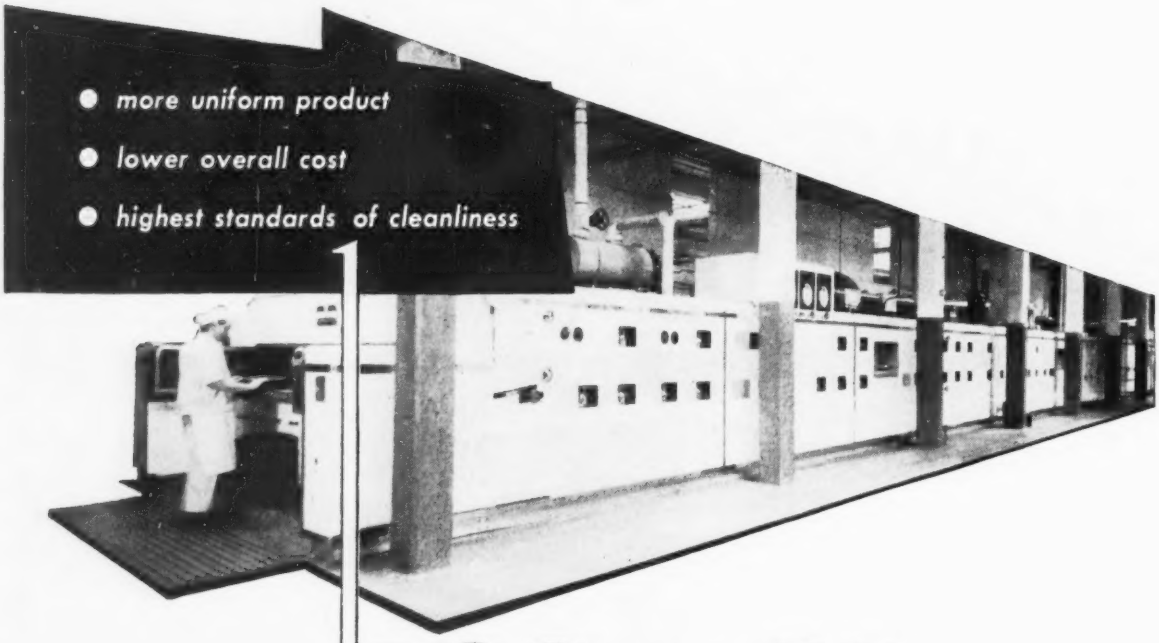
INTERNATIONAL HARVESTER COMPANY • CHICAGO

International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . Motor Trucks . . Industrial Power . . Refrigerators and Freezers

Better roads mean a better America

INTERNATIONAL TRUCKS
"Standard of the Highway"

For more information, use coupon on page 157.



because

DUGAN BROTHERS bake with GAS

Direct-fired Gas Traveling Oven
Manufactured by Baker-Perkins

Dugan Bakeries in Newark, New Jersey, and Queens Village, New York, turn out thousands of loaves of bread and a full line of cakes, cookies and pies every day, uniformly baked in Gas-fired Traveling Ovens.

Based on years of experience with modern GAS ovens, Dugan Brothers emphasize these points:

- **Rapid heat recovery in the oven assures a completely uniform product**
- **Reduced maintenance of equipment results in lower overall costs**
- **Cleanliness in keeping with the highest standards of the baking industry**

MORE AND MORE...
THE TREND IS TO GAS
FOR COMMERCIAL BAKING

When you use Modern Gas Ovens you can be sure of similar results whether you are baking bread, cake, cookies, specialties, or any combination of baked goods. With automatically controlled GAS your products will always be uniform, your maintenance problems simple, and your plant sanitation tasks greatly reduced.

Why not call on your GAS Company Representative and your Bakery Equipment Specialist to aid you in planning your next GAS oven installation.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE • NEW YORK 17, NEW YORK

For more information, use coupon on page 157.

Wo oosh!

...with no damage done!

You'll certainly like the important savings on handling costs from Fairbanks-Morse *Bladeless* Impeller Food Pumps. They eliminate food damage losses so common with ordinary transfer pumps!

The difference is in the impeller. With no blades to catch or damage, you can handle the most delicate fruits and vegetables—even hard-boiled eggs have been pumped without cracking!

Check on this *Bladeless* Impeller Food Pump for your operations—call your Fairbanks-Morse Branch Pump Engineer or write to Fairbanks, Morse & Co., Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the best

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY
RAIL CARS • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

Time to double check VANILLA *Quality*

Many manufacturers today are revising their vanilla flavor formulations, and this is the time to put the stress on quality — make a change for the better. The trend is back to real vanilla taste and the standard Alva vanillas have been doing just this job for years.

In selecting any vanilla, pure or imitation, double check it with the finest pure vanilla extract. Then buy the best you can afford.

With the changing vanilla picture it is important that you check the famous Alva vanillas. There are many to suit your needs, both pure and imitation. The Alva laboratories are eager to help. Send us your problem.

PURE VANILLA EXTRACT
The finest extract, processed for over two months.

PURE VANILLA 4X
Same quality as above, four times stronger.

VANILLA-VANILLIN
The best pure extract extended with vanillin.

IMITATION VANILLA 4X
Developed on a natural vanilla bean base.

IMITATION VANILLA 4X (Special)
An inexpensive grade, excellent for specialties.

IMITATION VANILLA
A clean, brilliant flavor, fine as a chocolate stretcher.

VANILLA SUGAR (Imit.)
A dry imitation bean powder.

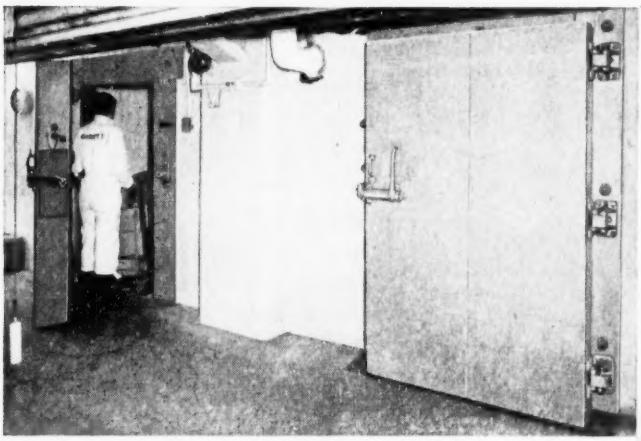
VAN AMERINGEN-HAEBLER, Inc.
521 West 57th Street, New York 19, New York

Alva FLAVORS

JAMISON doors really hold up under hard usage

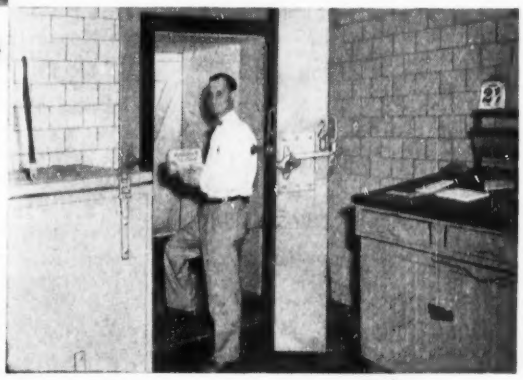
— reports Hershey Creamery Co.

The Hershey Creamery plant in Harrisburg, Pa., produces over 32,500,000 pint packages of ice cream a year—the world's largest producer in this size. Cold storage rooms in the plant get hard daily use. The plant superintendent, H. E. Sauers, in commenting on storage room traffic said: *"We are well pleased with the way the Jamison Doors stand up under the extreme usage they get in our plant."*



PACKAGE STORAGE ROOM. Jamison Metal Clad Super Freezer Doors maintain a tight seal at all times in these 25° below zero rooms. Positive seal makes refrigeration more efficient by preventing frost from accumulating on refrigeration coils. Thickness of insulation in doors equals that of walls.

PLATFORM BULK STORAGE ROOM. 2½ gallon packages of ice cream are stored in this 30° below zero room. Patented Super Freezer Fastener on metal clad door is most efficient fastener available for doors of this type. H. E. Sauers, Plant Supt., is keeping door in check.



FRUIT STORAGE ROOM. A Jamison Standard Door is used for this room storing fruits and flavors of all types. Temperature of room is held to 40° above zero. Completely metal clad doors insure maximum sanitation and simplify cleaning operations.

JAMISON

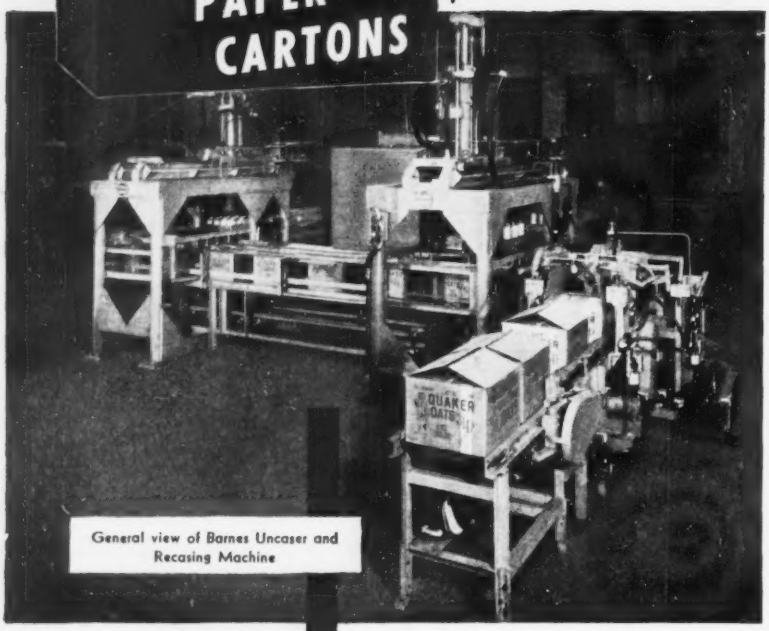
HAGERSTOWN, MARYLAND, U. S. A.

Jamison Cold Storage Door Co., Hagerstown, Md., U.S.A.
World's largest builders of cold storage doors—specialists for over 50 years.

For more information, use coupon on page 157.

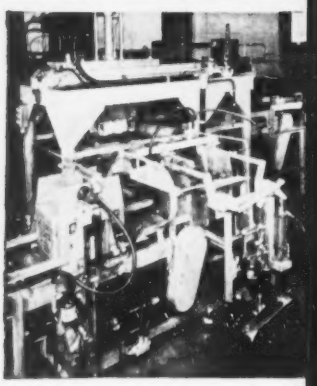
IF YOU USE PAPER CARTONS

Investigate This Barnes Uncaser and Recasing Machine



General view of Barnes Uncaser and Recasing Machine

This new magnetic Uncasing and Recasing machine unloads and reloads 200 cartons per hour. Each carton holds 36 cans. Paper cartons of empty cans are conveyed to the flap opening station where one pair and then the other pair of flaps are opened by vacuum lifters. The carton is then transferred to position under a rectangular magnet which lifts the cans out onto a belt conveyor. There are two layers of cans in a carton so the magnet operates twice for each carton.



View showing vacuum lifters

The belt conveyor moves the cans to an "unscrambler" which delivers them single-file to the filler. After filling, the cans are conveyed back to the machine for recasing.

Detailed view of reloading station

FREE ADDITIONAL DATA on this and other Barnes Processing equipment is available upon request. Ask for bulletin E-853

W. F. and JOHN BARNES

PROCESS EQUIPMENT DIVISION 303 SOUTH WATER STREET, ROCKFORD, ILLINOIS

(ADVERTISEMENT)

ASEPTIC CANNING CREAM STYLE CORN

The Martin Aseptic Canning System offers a means of eliminating the processing in the can by taking advantage of short-time high-temperature sterilization of the product in a closed heat exchange system and filling it cold into a sterile can.

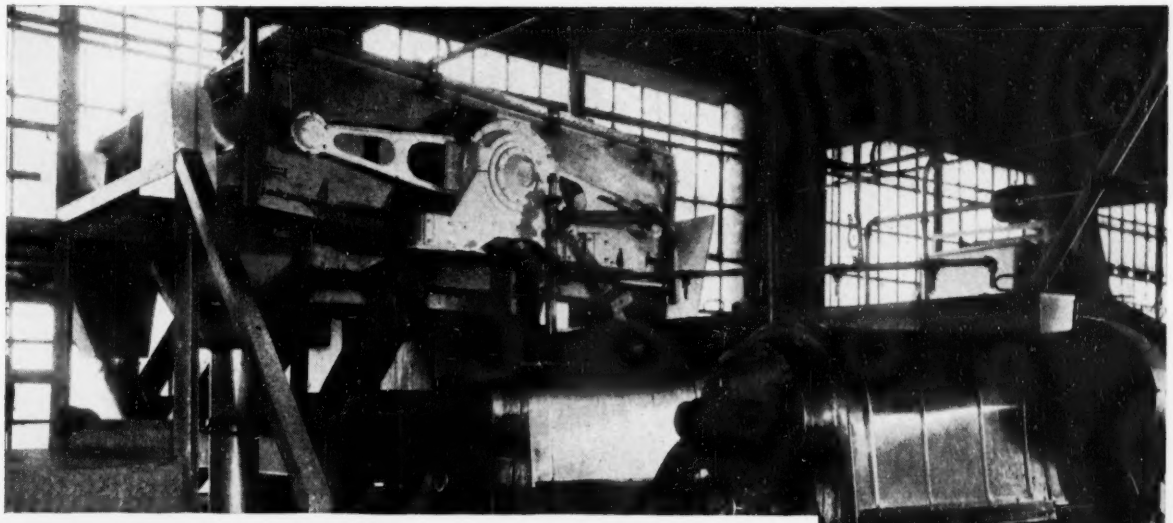
CORN PROCESSED OUTSIDE OF CANS

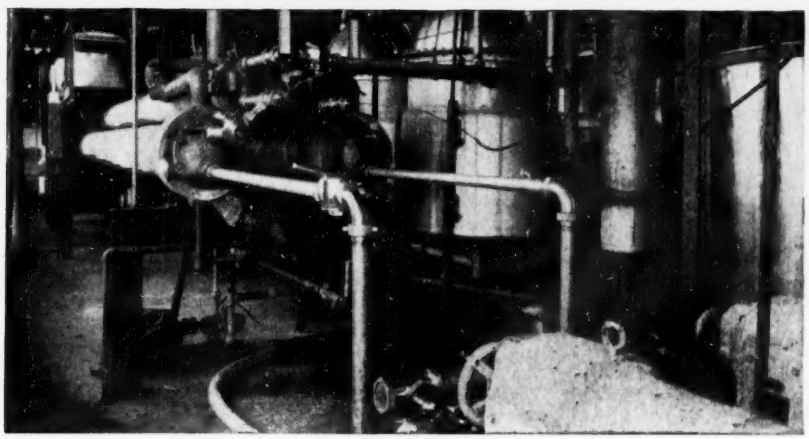
Attractive features of the Martin System include continuous straight-line flow of both the product and the cans, low utility requirements, small space requirements, low manpower costs, and improved flavor, color and quality in the finished product. One feature of particular interest is the fact that because the corn was processed outside of the can, the finished canned product has identical quality regardless of size of container used.

CARMELIZED TINT ELIMINATED

Test cuttings of the Aseptic pack show that the product produced by this method has a vast improvement in color by eliminating the characteristic brown or carmelized tint found in present in-the-can processed cream style corn.

Two papers were delivered at the Canning Machinery & Supplies Association Convention recently. These papers offer additional information on Aseptic Canning and are available upon request. Write to W. F. and John Barnes Company, 301 South Water Street, Rockford, Illinois.





REFUSE IS REMOVED from the tomato pulp and juice by the Stainless Steel Selectro vibrating screen in the rear and by the centrifugal extractors in the foreground, which are also Stainless. The vibrating screens were manufactured by Productive Equipment Corporation, Chicago.

PASTEURIZING THE JUICE takes place in the Struthers Wells heat exchangers at the left. Stainless Steel tubes in these 20-foot cylinders carry the juice surrounded by steam in the jackets. At the right are flash tanks which reduce juice to filling temperature.

To protect the "Vitamin C" in tomato juice

YOU CAN'T BEAT STAINLESS STEEL

PROCESSING of tomato products imposes severe requirements from an equipment standpoint. The equipment must be able to stand the attack of acid and salt, it must be easy to keep clean, and, highly important, it must not affect the flavor or Vitamin C content of the product being processed.

Stainless Steel fills all these requirements and fills them well. That's why Stainless Steel equipment is used from one end of the tomato juice processing line to the other at the Welch Grape Juice Company, Inc., North East, Pa.

Welch uses Stainless extensively on the product that gave the Company its name and follows the same method on tomato juice. Hoppers and choppers that turn tomatoes into pulp and juice, vibrating screens and extractors that remove refuse, pumps, homogenizers, pasteurizers and fillers—all are Stainless Steel.

No matter what food product you process, the benefits of Stainless Steel go a long way toward making continuous processing really continuous while maintaining quality at its highest point. You'll find Stainless Steel equipment a paying investment, especially when your equipment fabricator uses perfected, service-tested U·S·S Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S STAINLESS STEEL

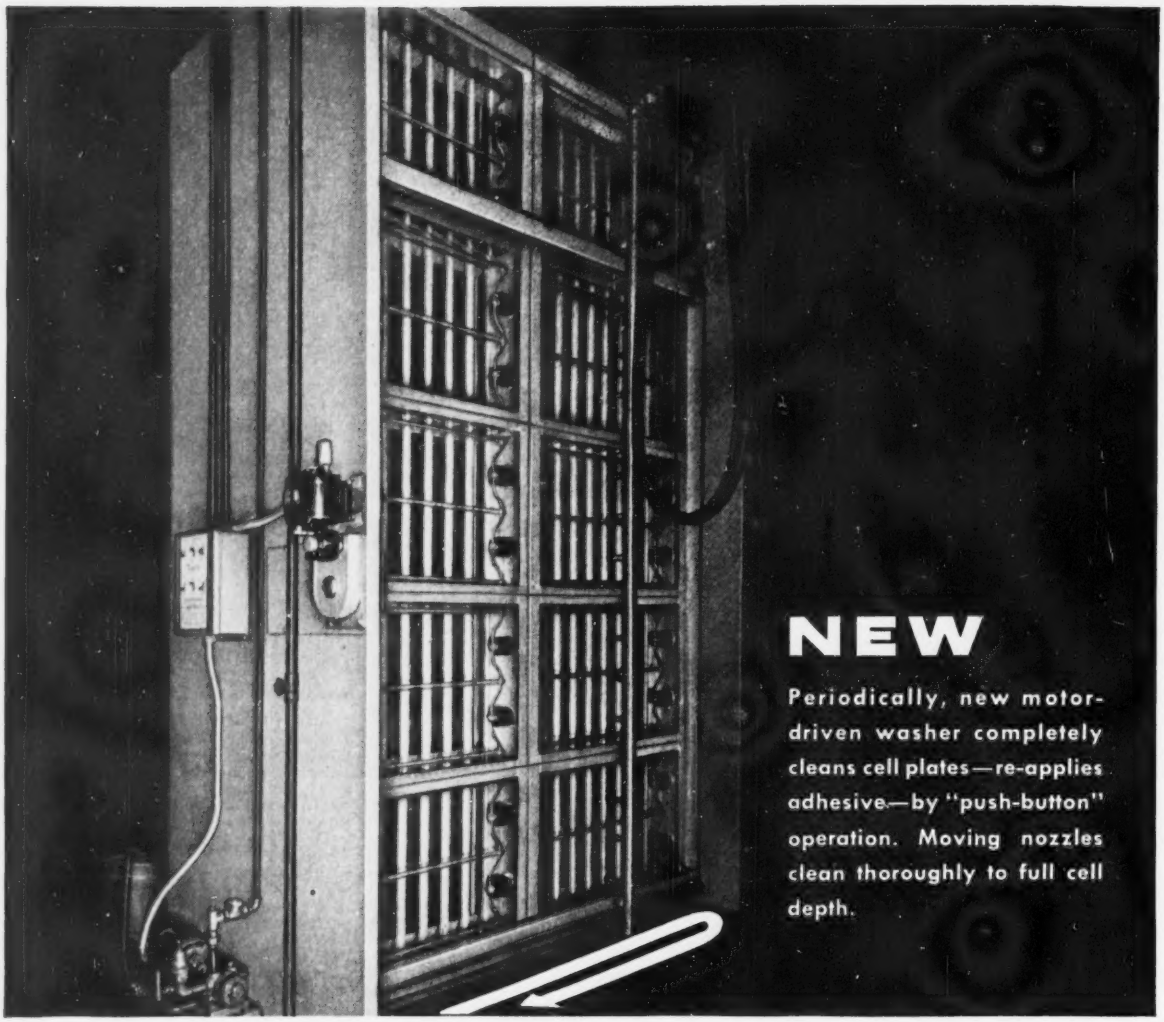
USS

SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS

3-1264

UNITED STATES STEEL

For more information, use coupon on page 157.



NEW

Periodically, new motor-driven washer completely cleans cell plates—re-applies adhesive—by "push-button" operation. Moving nozzles clean thoroughly to full cell depth.

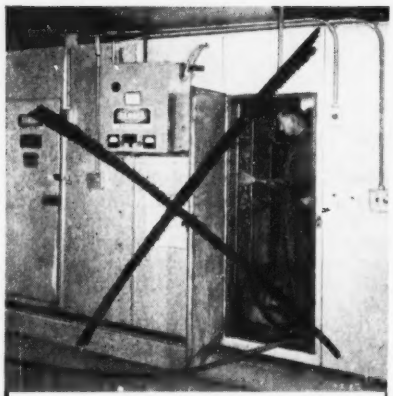
NOW—"PUSH-BUTTON" WASHING FOR ELECTRONIC AIR CLEANER

Now, a new, low-cost, automatic PRECIPITRON® washer cuts maintenance costs and eliminates unpleasant inside-the-duct washing of cells.

This unique device features moving nozzles, making PRECIPITRON the easiest electronic air cleaner to service. After thoroughly cleaning the plates, the washer re-applies adhesive. Entire operation is under "push-button" control. Laboratory and field tests have proved that moving-nozzle washing is a "must" for proper cleaning.

Type PX PRECIPITRON, the electronic air cleaner, traps microscopic airborne particles of dirt, dust, grime and pollen which would pass through conventional filters. It fits into any heating, ventilating or air conditioning ductwork.

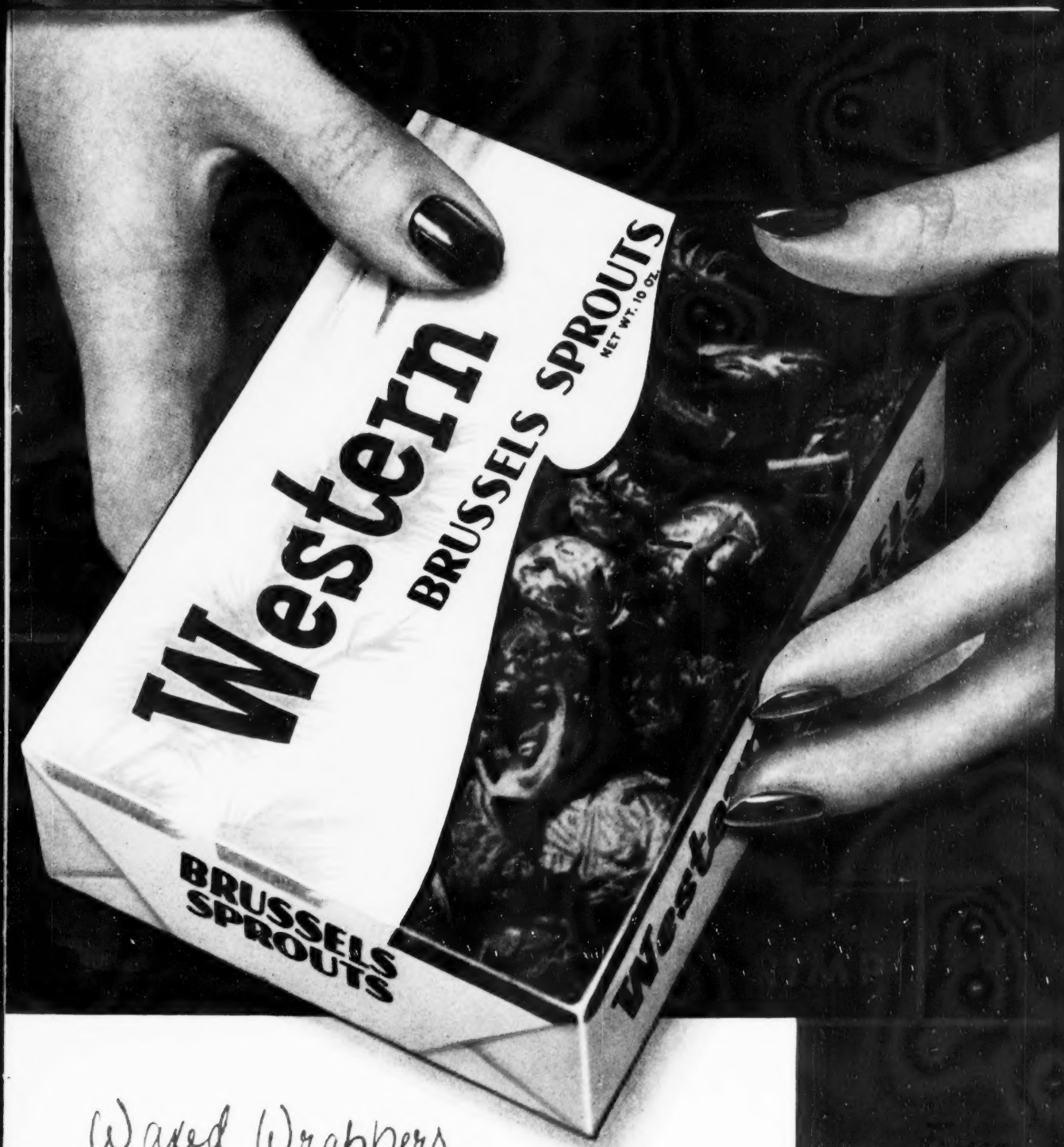
Learn how PRECIPITRON will keep the air in your building dirt-free at negligible cost. Call your local Westinghouse-Sturtevant office, or write: Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Massachusetts.



Maintenance men no longer need to enter enclosure to clean PRECIPITRON. New "push-button" feature does away with hot, wet tasks.

WESTINGHOUSE AIR HANDLING

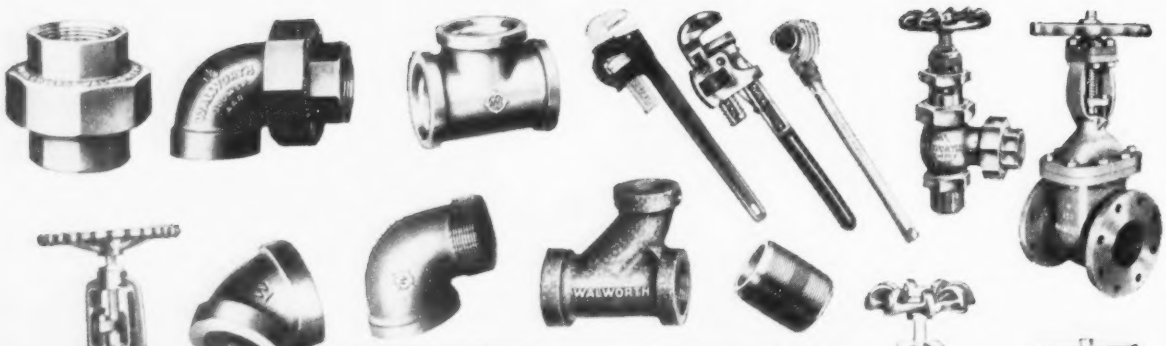
YOU CAN BE SURE ... IF IT'S Westinghouse J-80231



Waxed Wrappers
designed to increase
Frozen Food Sales

WESTERN WAXED PAPER DIVISION • CROWN ZELLERBACH CORPORATION

SAN LEANDRO, CALIFORNIA • EAST LOS ANGELES 54, CALIFORNIA • NORTH PORTLAND, OREGON



Walworth manufactures a *complete line* of Gate, Globe, Angle, Check, and Lubricated Plug Valves, made of Stainless Steel, Steel, Iron, Bronze, and Special Alloys in a wide range of sizes and temperature-pressure ratings.

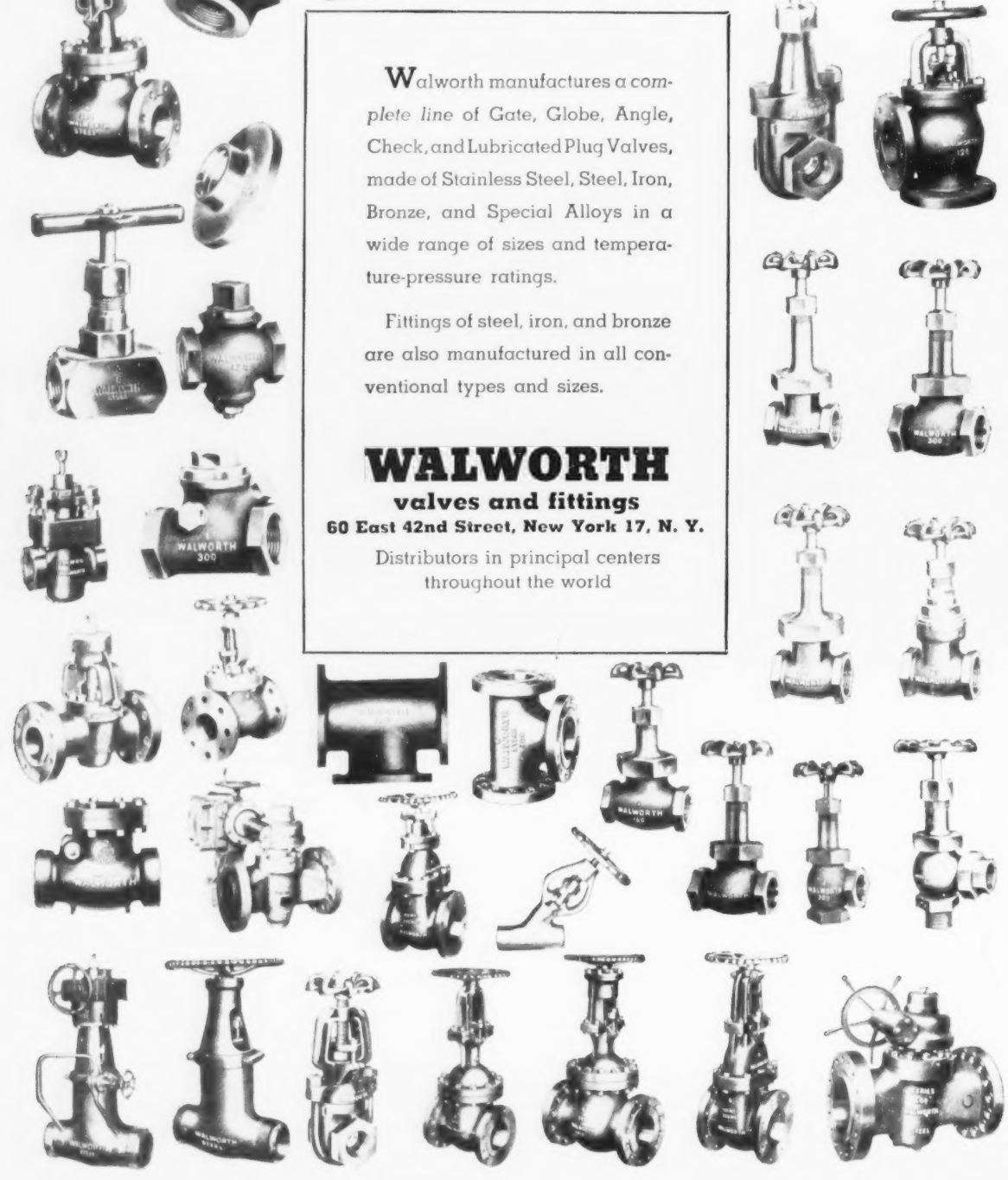
Fittings of steel, iron, and bronze are also manufactured in all conventional types and sizes.

WALWORTH

valves and fittings

60 East 42nd Street, New York 17, N. Y.

Distributors in principal centers throughout the world



DOW

IMPROVED MOISTURE CONTROL FOR YOUR SOLID FOOD PRODUCTS

DOW PROPYLENE GLYCOL, U.S.P., effectively controls moisture level at low cost . . . improves sales appeal of solid food products

Dow propylene glycol, U.S.P., is a valuable aid in controlling the moisture level in many solid food materials. Dried fruits, coconut, nutmeats and many other foods benefit from the use of this hygroscopic material which attracts and holds moisture from the air.

In the preparation of food flavors, too, propylene glycol has gained wide acceptance for its high efficiency of solvent action on a varied range of flavoring materials, with resulting economy.

Propylene glycol as a solvent, humectant, emulsifying aid or wetting agent can help you realize economies in your food plant. For additional information regarding propylene glycol, U.S.P., write to Dow, Dpt. OC 3-27A. THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW CHEMICALS

DOW

For more information, use coupon on page 157.

4 Powerful Reasons Why CHEVROLET ADVANCE-DESIGN TRUCKS will save money on *your* job . . .

EXTRA THRIFTY POWER! The improved Loadmaster engine in heavy-duty models has new high-compression ratio (7.1 to 1) to squeeze more power . . . more work out of every drop of fuel. In light- and medium-duty models, Chevrolet's advanced Thriftmaster engine delivers top-notch operating economy. Both give you the extra-long life and day-in, day-out dependability for which Chevrolet valve-in-head truck engines are famous.

ENGINEERED FOR THE JOB! Whatever you haul . . . wherever you haul it, your Chevrolet truck will be factory-matched to fit your requirements. That means you get the *right* power and the *right* chassis units throughout—tires, axles, springs and clutch—to suit your roads and loads. It means a truck that will do your job more easily . . . more efficiently.

MORE RUGGEDLY BUILT! New Chevrolet trucks are stronger and sturdier than ever before. Frames, for example, are heavier and more rigid. This extra, built-in stamina means miles added to truck life and dollars *subtracted* from upkeep costs! Another important "plus" you get with Chevrolet trucks!

AND THEY LIST FOR LESS! No other truck offers all of Chevrolet's advance-design features . . . all of Chevrolet's money-saving advantages. Yet Chevrolet is the lowest priced truck line of all! See your Chevrolet Dealer. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTIPANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

CHEVROLET first in demand in value in sales

so an Ostrich can take it . . .

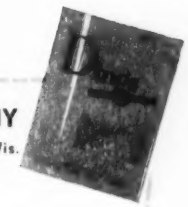
. . . maybe your processing equipment is a little less hardy than the proverbially tough digestive mechanism of this odd bird.

Bits of iron—nails, wire, crushed tin, nuts and bolts—are a headache, sometimes a serious hazard, to a lot of food, chemical, and other processors. Many have successfully relied on Dings Magnets to solve their problem.

Dings makes a complete line of electric and non-electric magnets for installation in, on or above material conveying systems and integration with processing machinery. They can save you plenty of trouble. Learn about them by just mailing the coupon below.

Here's Just One Way — Dings Magnetic Pulleys — both electro and Alnico permanent — are at work in all kinds of industries pulling unwanted iron out of everything from grain and cotton to coal and molybdenum ore.

Dings



DINGS MAGNETIC SEPARATOR COMPANY

4741 W. Electric Ave. Milwaukee 46, Wis.

Please send me a copy of Catalog C-5000-B

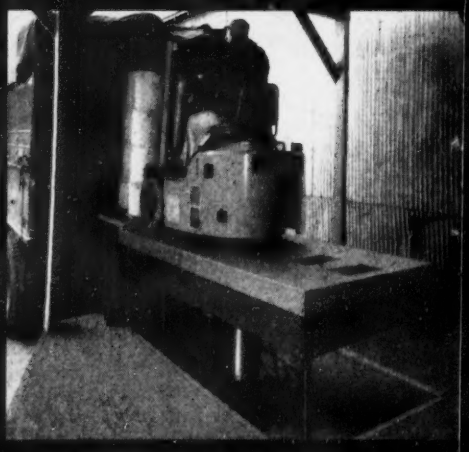
Name..... Title.....

Firm .....

Address .....

For more information, use coupon on page 157.

NEW!



SELF-STOPPING

SELF-LEVELING

SELF-STARTING

FULLY AUTOMATIC...

- ***Eliminates Human Element***

LOAD-O-MATIC*

THE LOADER WITH THE MECHANICAL BRAIN

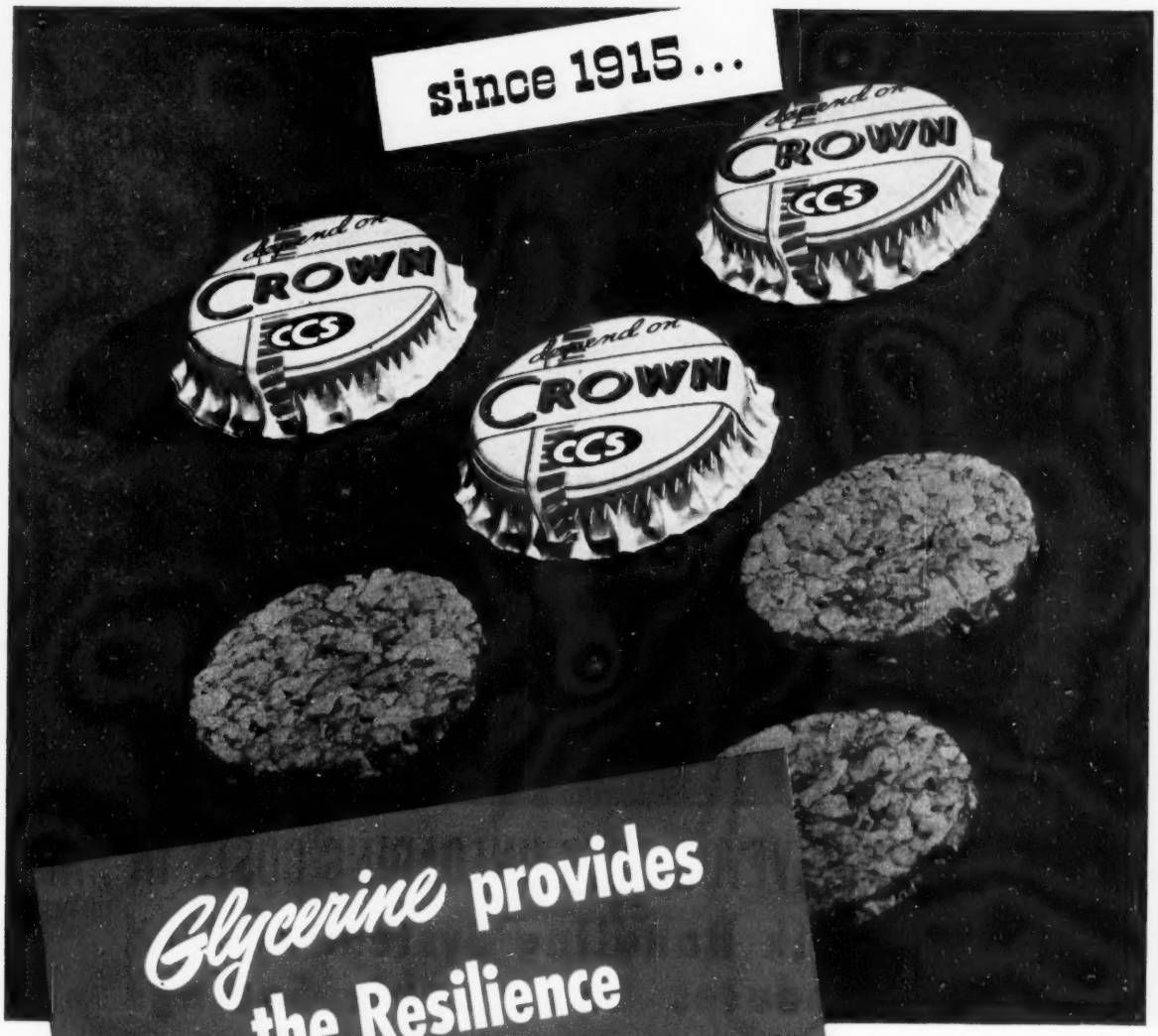
CUT LOADING COSTS! Eliminate spilling caused by bumps! Improve safety and insurance standings! You can accomplish them all with a Field LOAD-O-MATIC. This new, completely-automatic loading platform carries loads from loading dock to truck floor, whether truck is above or below dock. Look at pictures above. Front wheels trip switch bar and up goes platform. Patented leveling ramp stops platform when it is even with truck floor. After load has been placed in truck, loading platform automatically returns to dock level.

No hand switches! No grades!
Exact levels! No spills!

Write for descriptive literature and information on nearest dealer.

*Patent Applied For

THE FIELD ENGINEERING CO., 66 Foote Ave., Jamestown, N. Y.



Glycerine provides the Resilience

Crown Cork & Seal Company Inc., originators and world's largest makers of crown corks, have used Glycerine for nearly 40 years. Glycerine helps to keep the binder in the cork discs supple, assuring a dependable seal and trouble-free bottling.

Two properties make Glycerine a natural for use in Crown Cork & Seal's composition cork discs. Glycerine helps keep the discs resilient, so that they provide a tight, long-lasting seal.

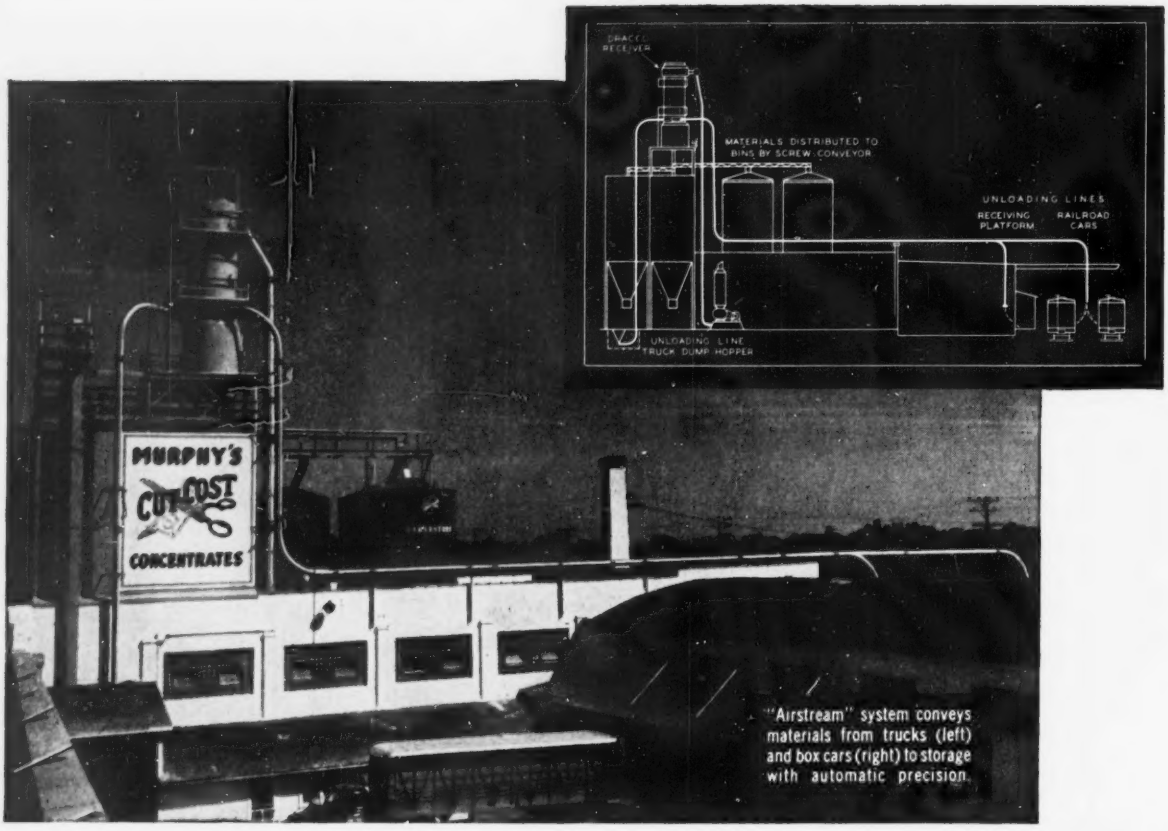
What is equally important, Glycerine is non-toxic. It is accepted by medical associations and government agencies as safe for use in contact with foods.

Indeed, U. S. P. Glycerine is an important *ingredient* in many confections, flavoring agents, and other food products. Versatile Glycerine can serve as a sweetener, solvent, or blending agent. Its high viscosity imparts smoothness to mixtures, prevents graining.

A handy 16-page booklet, "Why Glycerine for Foods?" reviews Glycerine's unique range of properties and applications. For your copy, write Glycerine Producers' Association, 295 Madison Avenue, New York 17, N. Y.

Nothing takes the place of Glycerine

For more information, use coupon on page 157.



"Airstream" system conveys materials from trucks (left) and box cars (right) to storage with automatic precision.

Airstream CONVEYOR CUTS UNLOADING COSTS IN HALF!

Dracco Bulk Handling System at Feed Plant Produces Remarkable Savings

Handling costs for unloading feed ingredients at the Murphy Products Co., Burlington, Wisconsin, have been slashed to 50% of former levels. Installation of a Dracco "Airstream" Conveyor system has eliminated manual handling and made possible this outstanding economy.

Murphy Products Co., large producers of feed concentrates, unloads large quantities of ingredients including meat scraps, soybean oil meal, linseed meal, gluten meal, salt and other feed components. In place of expensive manual methods, an automatic, dust-free Dracco "Airstream" Conveyor (operated by two men) now does the job. The cost-cutting "Airstream" system propels feed components to storage at 30 tons per hour. Box cars are emptied in an hour and trucks in less time.

By using the "Airstream" technique, ingredients can now be received in bulk, eliminating the cost of bags. Outstanding savings are thus realized on buying and handling feed ingredients at Murphy.

The introduction of the mechanized "Airstream" method has resulted in remarkable savings in many plants. If you handle bulk materials, write today for information on how to move them by "Airstream".

DRACCO CORPORATION
4085 East 116th Street • Cleveland 5, Ohio

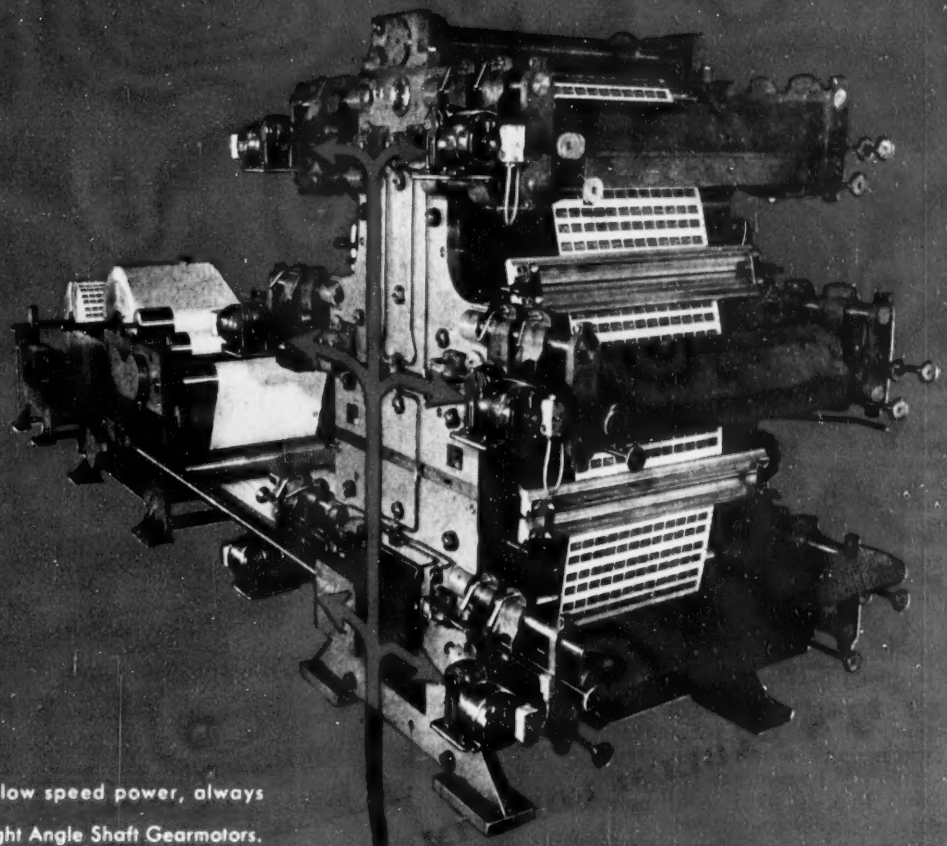
The economies and advantages of the Dracco "Airstream" method are presented in Bulletin 529. A copy will be sent you on request.

DRACCO

Performance Proved

Airstream CONVEYORS • DUST CONTROL EQUIPMENT

For more information, use coupon on page 157.



When you must have slow speed power, always consider first MASTER Right Angle Shaft Gearmotors. They're very compact . . . low in cost . . . safe . . . and so easy to use.

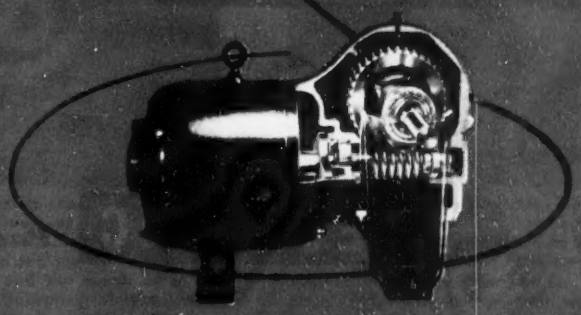
And nowhere else can you get anywhere near the wide range of selection that you have in MASTER Right Angle Gearmotors. They're available in sizes ⅛ to 25 Horsepower for all electrical specifications and in splash-proof, enclosed or explosion-proof construction. Gear reduction ranges up to 430 to 1 with the countershaft in either horizontal or vertical positions. In addition these gearmotors can be supplied with integrally built electric brakes . . . three types of variable speed units . . . and with fluid drive units for cushioned power.

Try them . . . you'll find they're the horsesense way to get slow-speed horsepower.

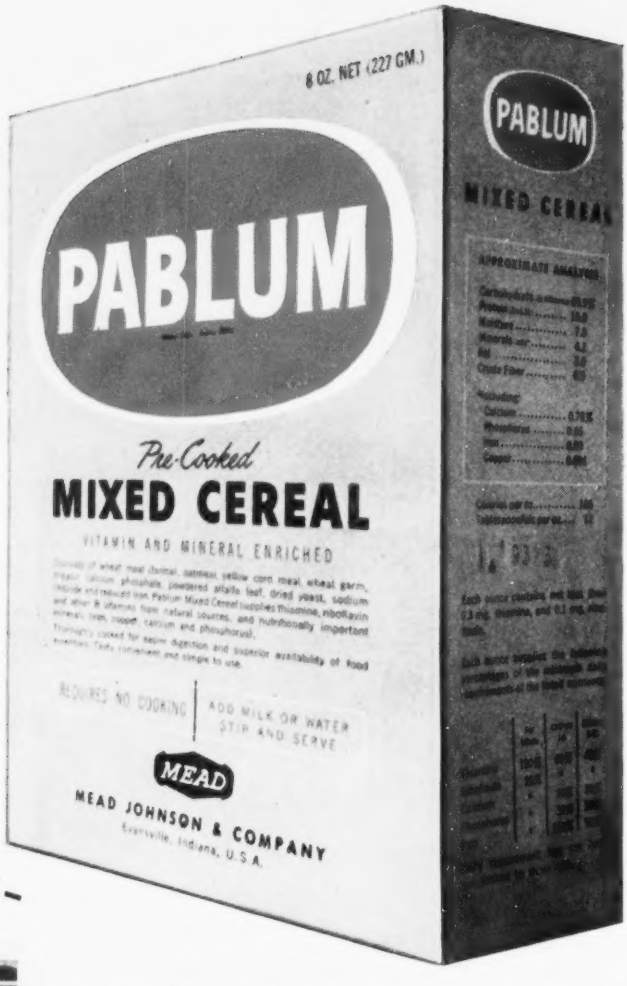
THE MASTER ELECTRIC COMPANY

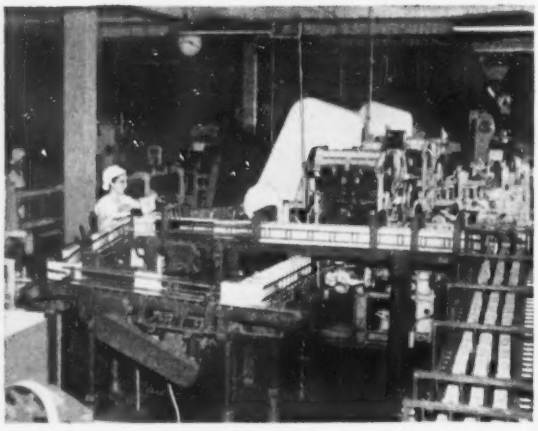
DAYTON 1, OHIO

you can't beat them for compact slo-speed power



IT'S PABLUM FOR HIM—





Pneumatic's High-Speed Tight Wrappers applying labels to the Pablum packages at Mead Johnson's Evansville, Indiana, plant.

for PABLUM it's PNEUMATIC!

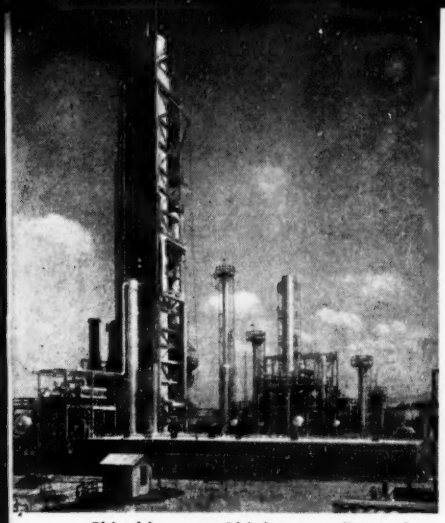
Pneumatic can proudly claim parentage, in large part, of the striking new PABLUM package. In all the mechanical operations of automatically forming, filling, sealing and tight wrapping this famous carton is a Pneumatic baby! That goes, also, for the whole PABLUM family of infant cereals.

You might say that Mead Johnson & Company are sold on Pneumatic machines. You might well say the same thing about most leading producers of packaged or bottled goods, without fear of contradiction. That's simply because experienced buyers of packaging equipment are in complete agreement on the engineering and operating superiority of Pneumatic machines. From drafting board to assembly floor each is planned and built to do its own special job at a "lower cost per container". The proof that they do just that is the fact they are first choice of America's most successful, most efficiently operated companies.

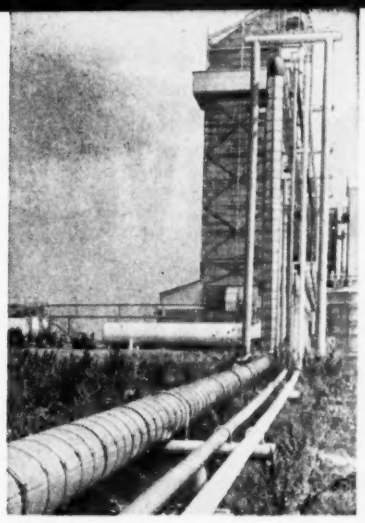
PNEUMATIC SCALE CORP., LTD., 91 Newport Ave., Quincy 71, Mass. *Also: New York; Chicago; San Francisco; Los Angeles; Seattle; Leeds, England.*

★PNEUMATIC

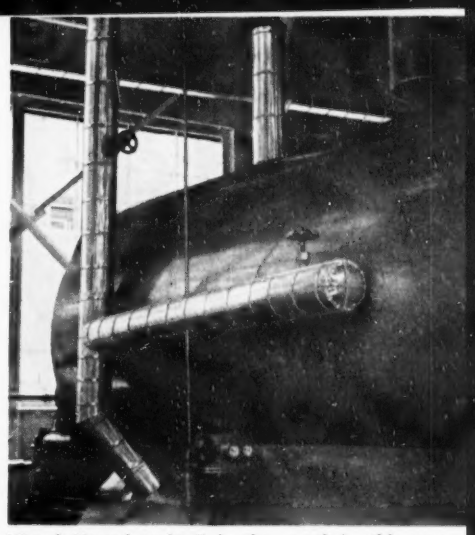
Packaging and Bottling Equipment



This big new Oklahoma refinery has used a new kind of aluminum jacketing throughout on both insulated lines and towers and vessels. Light in weight and low in cost, this new Childers Aluminum Jacketing cut installation costs. It is also expected to cut maintenance costs.



Childers Aluminum Jacketing is used here on a cross-country transfer line at a large chemical manufacturing plant in Texas. This is a rugged test for any jacketing, but the light-weight aluminum used in this jacketing should stand up to weather and chemical corrosion it encounters.

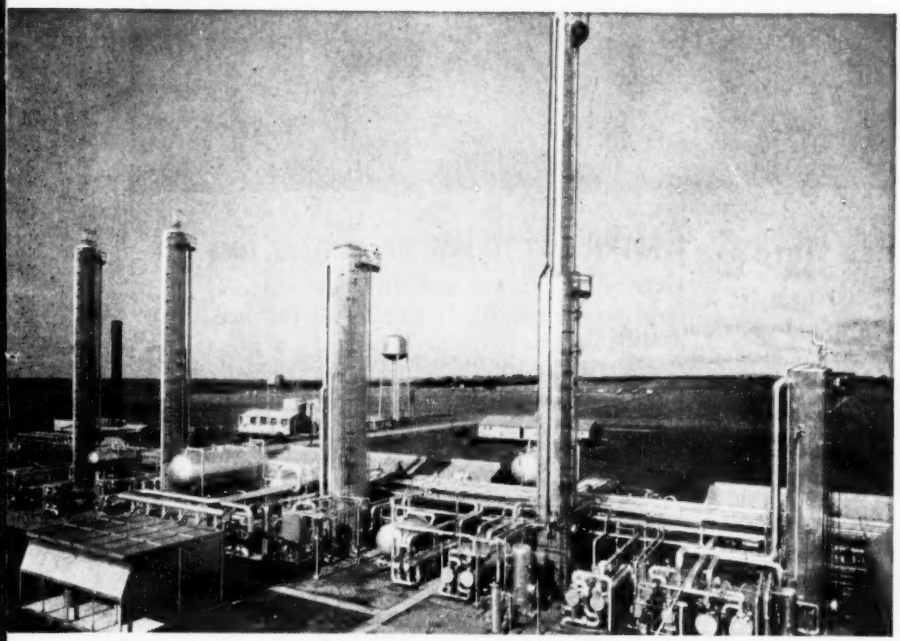


"Good Housekeeping" is the word in this gas pipeline pump station. The insulated lines are handsomely protected by Childers Aluminum Jacketing, which should last as long as the plant itself. The jacketing requires no painting and very little other maintenance. It even allows the interior of the plant to be washed with a hose without harm to the insulation. The chief engineer reports: "We have standardized on Childers Jacketing for all our insulated lines. It is doing an excellent job for us and saving us money."

How 5 plants cut costs of jacketing insulated lines

Weather-resistant, low-cost, easy to put on—these are big reasons for the growing popularity of a new jacketing, specially engineered for insulated lines. It is made of .006" thick aluminum and comes with or without a moisture barrier. It is called Childers Aluminum Weatherproof Jacketing. You can write for a free sample without obligation.

Address Childers Manufacturing Co., Dept. FE-2, 3620 W. 11th St., Houston 8, Texas.



Weather, wind and corrosive gases are not going to attack the insulation of this new plains-country gasoline plant. The insulation is protected by long-lasting aluminum: Childers Aluminum Weatherproof Jacketing. The management expects this low-cost jacketing to hold insulation maintenance costs to a minimum. Other advantages are that the jacketing went on quick and easy during construction; it required no special tools or skill — no shop forming or cutting. It can be taken off and re-used if lines are moved. Aluminum saves on painting and the tough 35 alloy used for Childers Jacketing should stand up for years even in highly corrosive industrial atmospheres. Check the advantages of this jacketing for your own plant.

Amazingly easy to handle, Childers Jacketing was applied here by men using no more than a wooden wedge and a pair of pliers. Childers has engineering representatives in every major industrial center who will be glad to confer with you on your particular jacketing problems. Write to address shown above.

Advertisement

Faster Deliveries with the WHITE 3000!

More Work . . . in less time!

That's what makes the White 3000 today's delivery favorite in the food industry...from coast to coast.

It saves time on deliveries and wins favor of drivers everywhere because of its safety, visibility and driving ease. It saves steps . . . saves energy.

The modern design of the White 3000 greatly improves maneuverability in traffic and congestion. It permits more payload capacity without increasing overall length.

And the exclusive power-lift cab substantially reduces maintenance costs.

Find out how it saves in *your* business.

MODERN WAY TO SAVE ON DELIVERY TIME

Here is today's way to deliver today's food favorites—frozen foods. Samuel Berlin, vice-president, Lurie Auto Co., Inc., has six of these modern White 3000's in frozen food delivery service in the New York area for Howell Trucking Co., Jersey City, N. J.

White

FOR MORE THAN 50 YEARS

THE GREATEST NAME IN TRUCKS

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio

For more information, use coupon on page 157.

ACCURACY wins in the RING

The skillful boxer, landing consistently with well-aimed jabs, usually beats the wild-swinging fighter whose lethal punches miss the mark. It requires accuracy as well as power to become a champion!

ACCURACY is a "must" with Ball

Smooth-running filling lines demand containers that fit your machines with precision. BALL checks and re-checks every order, every step of the way, to insure containers and closures of uniform accuracy. And our convenient plant locations mean prompt delivery. Whatever your container needs, call BALL first of all!

CALL BALL FOR...

Stock or Special Mold Glass Containers in all popular styles and sizes . . . Plain or Lithographed Metal Screw Caps, 24 to 120 mm. Engineering assistance on ANY container, closure or packaging problem.

BALL BROTHERS COMPANY
MUNCIE, INDIANA

OFFICES IN ALL PRINCIPAL CITIES

Closure Division: The Aridor Company, 3428 W. 48th Place, Chicago 32, Ill.
Factories at Muncie, Chicago, Hillsboro, Ill.; Okmulgee, Okla., El Monte, Calif.

For more information, use coupon on page 157.

...and go to a specialist for stainless

When it comes to stainless steel, no one has had broader experience in working out metallurgical, fabrication and application problems than Crucible. Stainless is actually a group of *special* steels. And we have been the world's largest producer of all types of special steels for 53 years.

Our technical staffs and field representatives are available to help you select the grade, size or finish that is most practical and economical for your product or processing operation . . . with due consideration for fabricating problems as well as service use.

Besides our broad technical service, you get as fine a quality stainless steel as is made because Crucible REZISTAL stainless is produced in mills that were built exclusively for producing these corrosion and heat resistant steels.

So for competent technical advice and quality stainless, call Crucible.

CRUCIBLE first name in special purchase steels

STAINLESS STEEL

53 years of Fine steelmaking

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • ALLOY • MAX-EL MACHINERY • SPECIAL PURPOSE STEELS

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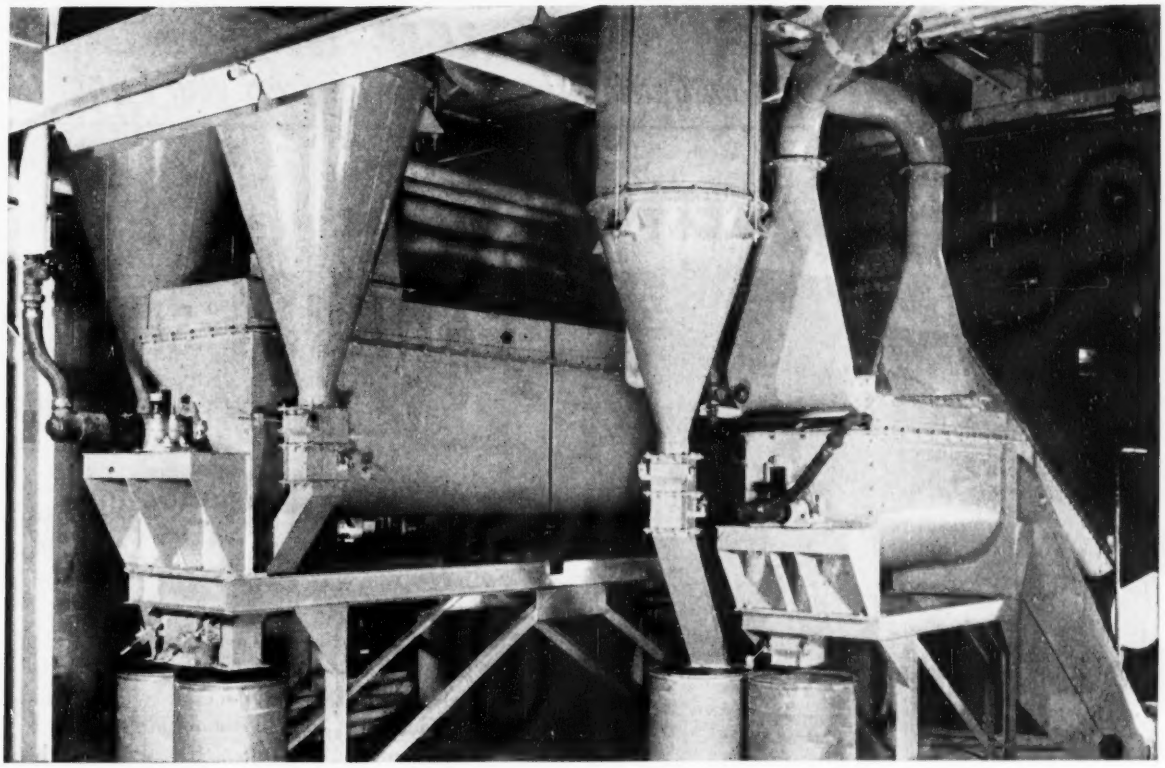


Midwest manufacturer saved enough in six months to pay for this two-unit Monotube installation. Solvents, formerly lost in processing, are recovered by drying.

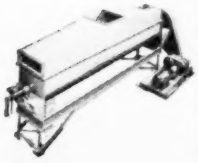
Here's double assurance of the *correct* dryer for your process

ROTO-LOUVRE

Drum design provides aerated mass drying. Will not damage heat-sensitive materials. Gradual, positive heat transfer prevents case-hardening. Ask for Book 1911-B.

MULTI-LOUVRE

For rapid treatment of large quantities of material. Uniform, constant agitation promotes efficient, uniform drying with minimum degradation. Ask for Book 2409.



MONOTUBE DRYER

For small, inexpensive installations. Excellent for fine-particle materials. Minimizes dusting. Equally effective at high or low temperatures. Ask for Book 2413.

LINK-BELT builds 3 types ..offers free testing service

No single dryer can meet all processing conditions—or dry every kind of material. That's why Link-Belt builds three types of dryers—Roto-Louvre, Multi-Louvre and Monotube. Each has specific advantages . . . provides drying service that matches particular production processes. In addition, we offer a free laboratory analysis of your material. We'll test it by utilizing our laboratory facilities . . . work out procedures that can be duplicated in your plant. Ask for this **free** service today. Simply send samples of your material, a pound or a ton, or call the nearest Link-Belt office for further details.

LINK-BELT

DRYERS • COOLERS • ROASTERS

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices in Principal Cities. 13,186

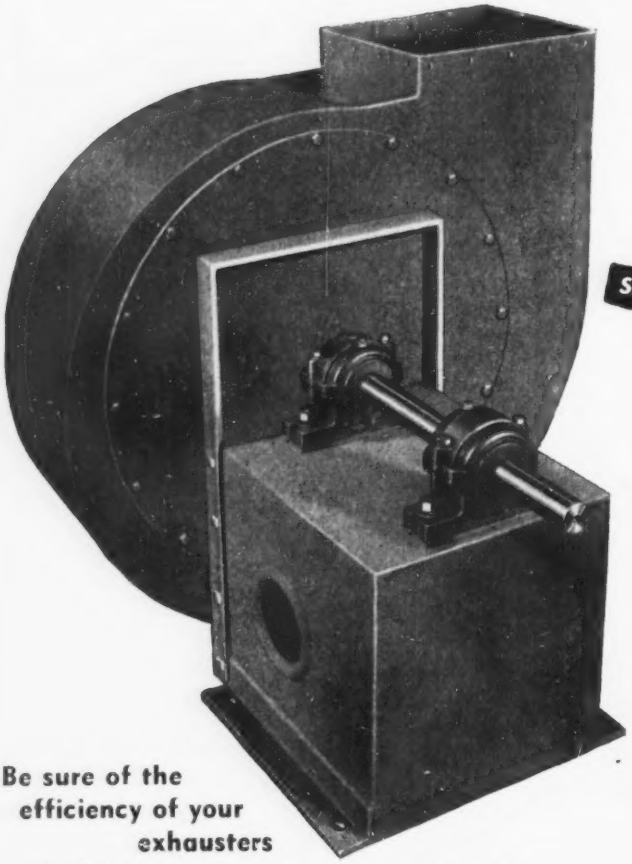
For more information, use coupon on page 157.

"Buffalo" *Tips on Getting the Best Service from your* **Fans**

FOR MOST ECONOMICAL

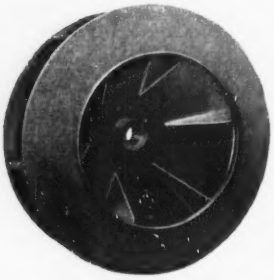
EXHAUST SERVICE

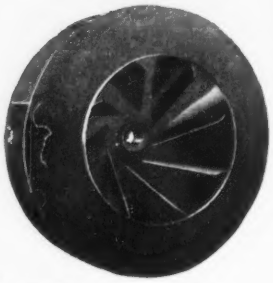
Year-In, Year-Out



SPECIFY "BUFFALO" INDUSTRIAL EXHAUSTERS

Lighter and stronger than riveted construction, "Buffalo" Industrial Exhausters have all-welded steel plate housings and rotor blades to stand up under the constant punishing service to which most mill exhausters are subjected. This means long-term savings.





Top, type "MW" Materials Wheel with stiffening back plate and flange. Bottom, type "AW" Air Wheel. Both are interchangeable.

Be sure of the efficiency of your exhausters

An inefficient fan is a power-waster, especially in continuous, heavy exhaust duty—more so if you have several fans going. But the smooth interior surfaces of "Buffalo" all-welded exhausters mean less friction—more efficient handling of air or materials. Then too, "Buffalo" Air Wheels and Material Wheels are shaped for efficiency—not the straight paddle wheel type.

IT PAYS TO INVESTIGATE!

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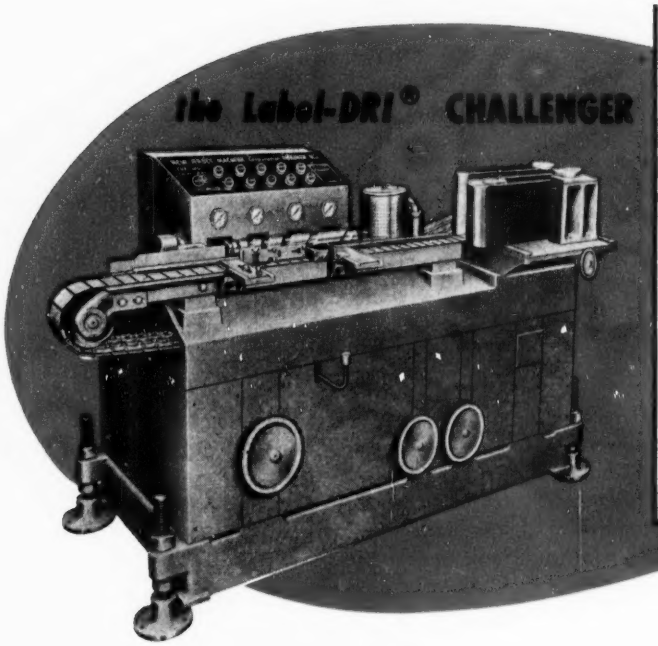

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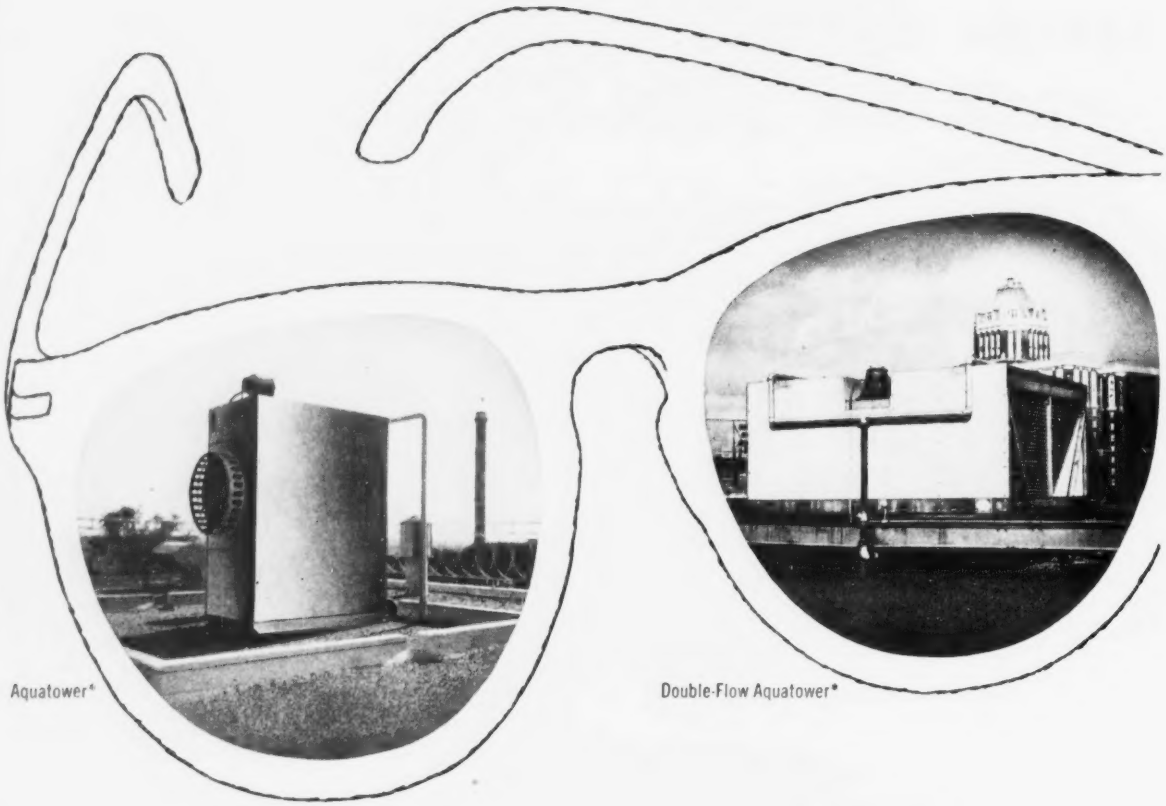

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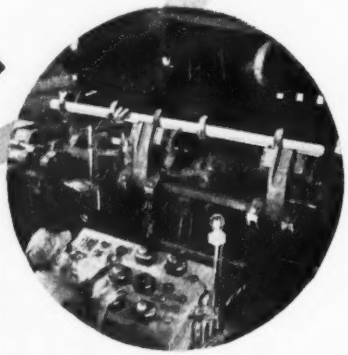

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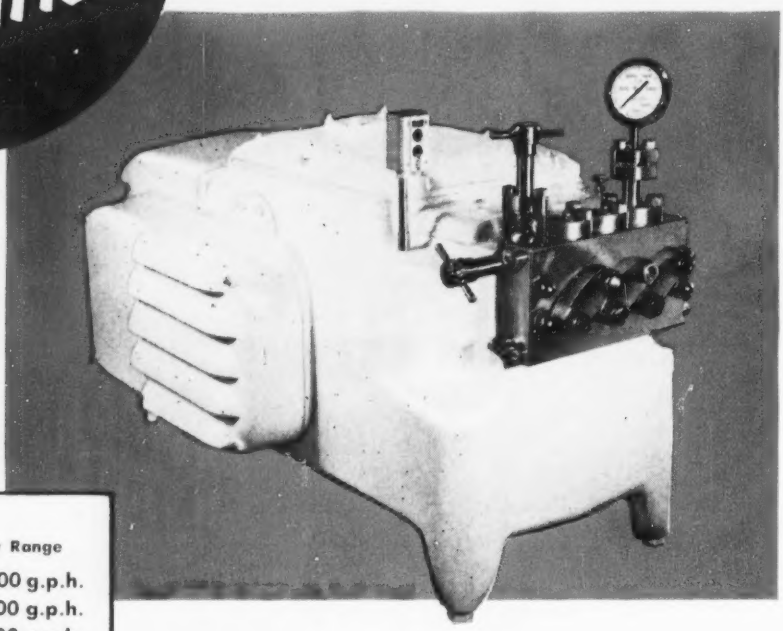

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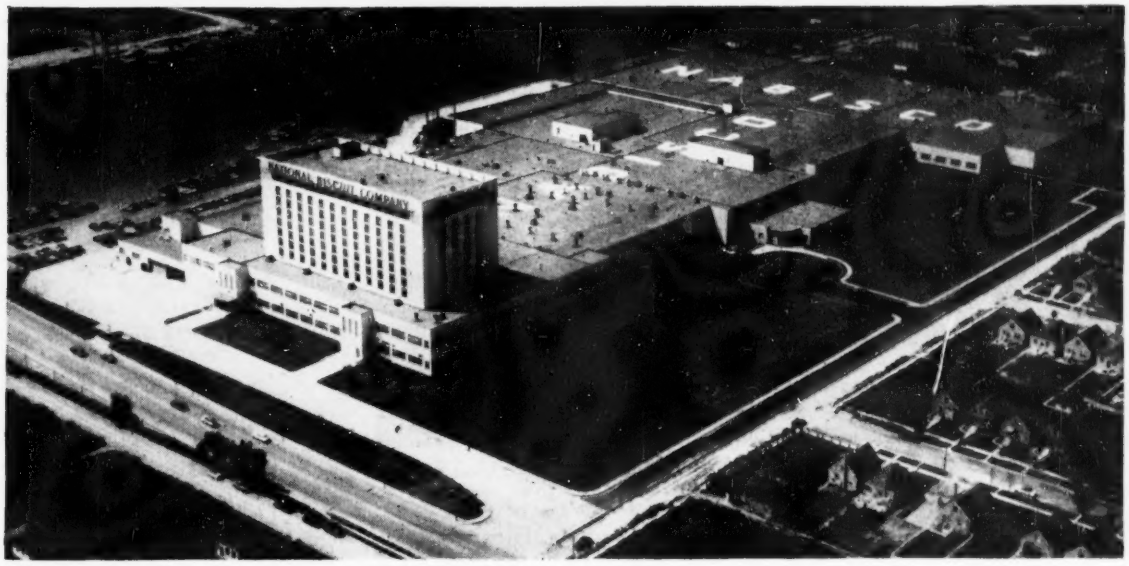


SWEEPING RANGE of facilities of huge bakery is accented in air view. Raws are stored in tower section (foreground), are mixed and baked in straightline ovens housed in center section. Goods leave via shipping area in rear.

Credit *Trail-Blazing Engineering* for This

"Last Word" Dozen-Oven Bakery

Vanguard pattern of innovations in new high-capacity Chicago biscuit plant invites sharp-eyed attention of every food processor, whatever his own product. Spotlighted are advanced techniques of materials handling, mixing, baking, and depositing. Sanitation stressed, also ease and safety of tasks

F. W. McCARTHY
Associate Editor, "Food Engineering"

Straightline, low-cost, mass production techniques form the solid economic base for the advanced operations in National Biscuit Co's new plant in Chicago—the world's largest biscuit bakery.

Highlights of the new plant are: Top-efficient bulk materials handling equipment for both solid and liquid raws; improved mixers that speed operations, up sanitation, and make the employees' tasks easier and safer; wider continuous-band streamlined ovens; automatic, sanitary packaging machines; depositors with special innovations, enclosed shipping areas; optimum working conditions, along with a full range of employee facilities and numerous extra benefits.

To achieve the comprehensive economies for which the plant was designed, a system of split supervision is employed—a general manager, manager, and a night manager, superintendents in charge of each department, foreman and assistant foreman in charge of various units, supervisors on the line. Total employees number 2,400. The plant usually operates on two shifts with a third running only at peak periods.

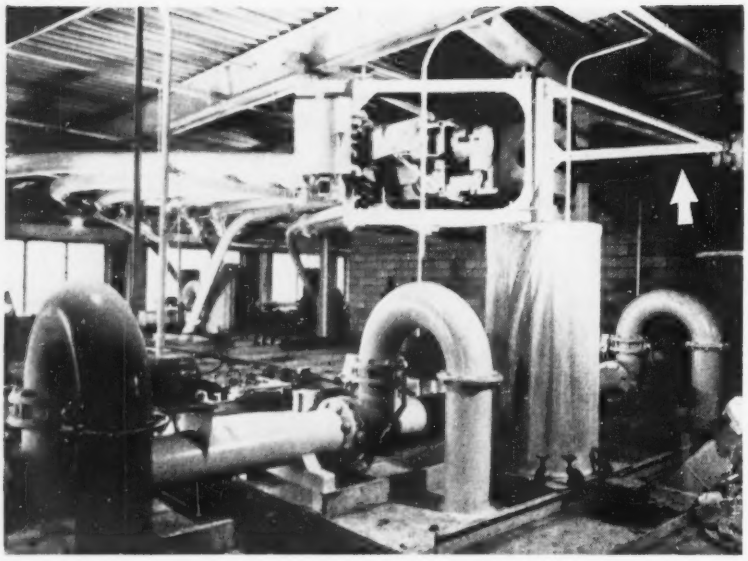
Heart of the plant comprises the twelve streamlined band ovens. Each is 300 ft. long. In width, seven are 32-in., five 38-in. The latter are the largest such units the company has ever installed.

Policy behind this program derives directly from Nabisco's President George H. Coppers. In his annual report to stockholders on 1952 operations he said:

"One of the outstanding features of the past year was our progress in the continuing program of plant modernization and the betterment of baking processes. Constantly rising costs over the last decade have intensified our efforts to increase operating efficiency right down the line. We know that only in this way can we maintain and improve our competitive position with products and prices that are attractive to the public."

Referring specifically to the new Chicago bakery, he noted its twelve band ovens and "most modern machinery and bulk handling equipment yet devised." It is, he pointed out "capable of producing about $55 million worth of biscuits and crackers annually for the important Mid-western markets and for other areas throughout the country."

He continued: "This new bakery represents another milestone in American industry's development of im-



IN TOWER TOP: Raws pass from incoming pneumatic tube (arrow) to switch connecting lines to bins. Three bins are filled from one receiver.

proved working conditions. New devices ease laborious tasks and promote greater safety. Emphasis on sanitation, a modern cafeteria, modern medical equipment and service, rest and recreation rooms, all increase employee comfort and convenience."

Easy Access

Located in a residential area of Chicago's southwest side, the bakery is easily accessible to motor and rail traffic. Four individual side tracks, total length 3,250 ft., serve it. Two freight car sidings—one for shipping (capacity 13 cars), the second (8 cars) for receiving raw materials and packaging materials are housed entirely within the building. Parking space is provided for 500 cars. Surrounding grounds are attractively landscaped.

Outstanding physical feature of the plant is the 131-ft.-high tower used primarily for storage of raw materials—flour, sugar, shortening, molasses, and syrups. This structure contains facilities for the storage of 115 carloads of raw materials.

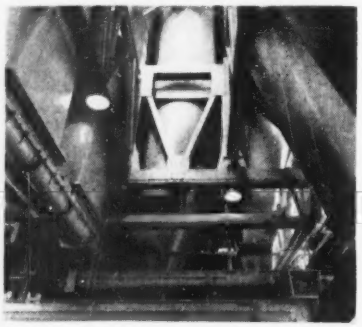
Overall length of the building is 1,118 ft., and it varies in width from 360 to 690 ft. Total floor area is 868,000 sq. ft. Space is divided into three levels: (1) Tower area (54,200 sq. ft.) for storage of raws; (2) mezzanine (223,300 sq. ft.) for mixing rooms, employee locker rooms, cafeteria, sugar-wafer department, and packaging; (3) main floor (580,000 sq. ft.) for warehousing, baking, additional packaging, icing, finished product shipping, offices, and other bakery functions.

Architectural design is modern functional. Structurally, the building has a steel frame with exterior Natco wall tile. Office areas are set off from the buff-colored tile of the bakery by use of iron-spot buff face brick, crab orchard stone, and limestone walls and trim. Other exterior trim is aluminum. All exterior windows and screens are of aluminum. Windows subject to sun glare are glazed with a special heat-absorbing glass. Selection of materials of construction particularly aimed at low-cost maintenance.

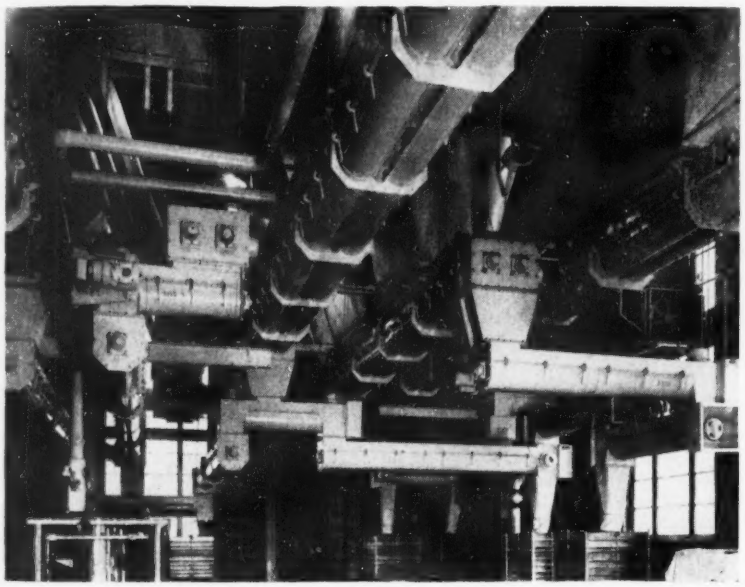
The art of "color conditioning" has been utilized in developing the bakery interior. The smooth-faced buff-tile walls combine with tinted cascade blue ceilings, eye-rest green doors, and polished hard maple floors to produce a pleasing, restful appearance. Equipment, too, is color standardized: Main body of each machine is green; moving parts, orange; electrical units, blue. This scheme was worked out by Nabisco's own engineers. Fluorescent lighting is used in all manufacturing areas. Lighting intensity maintained runs 35 to 40 candlepower, with daylight intensity at inspection areas, such as the delivery end of ovens.

To maintain ideal working conditions, big forced draft fans operate continuously to provide a change of air throughout the bakery every four minutes. Upon entering, this air passes through filters to assure its cleanliness, and a slight positive pressure is maintained to prevent any leakage from the outside. Large roof fans are located throughout the plant to exhaust all heated air.

Temperature of the tower is thermostatically maintained at 70 to 80 deg. F. to provide excellent storage



LOOKING UP at bins in battery of 93. Dia. of each is 7 ft. Individual bin capacity is 125,000 lb.



SPIRAL CONVEYORS move flours from bins to sanitary sifters. Hinged bottoms on movers permit fast and thorough cleaning of conveyor surfaces.

conditions for all the raw materials.

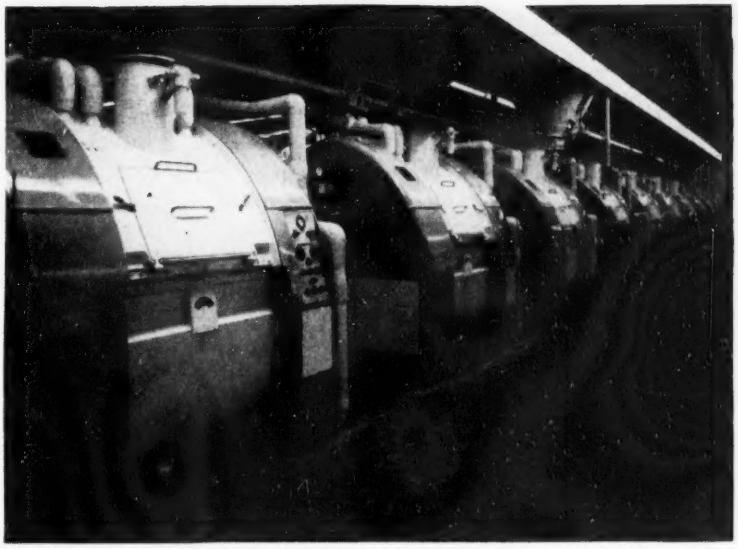
Four separate refrigerated rooms (total 155,240 cu. ft.) are included in the plant. Each is serviced by a separate refrigeration compressor employing Freon. Unit coolers regulate humidity. Waxed paper and some raw materials are held at 55 to 60 F. Rooms are built with Armorply—a plywood with polished aluminum-bonded exterior surface. This material comes in standard sections. Its erection proved fast and relatively simple. Standardization assures simplicity in any future expansion. Interior walls and ceiling in the proof room are faced with polished aluminum sheet metal.

Heating units in the building are supplied from a central boiler room equipped with package-type boilers.

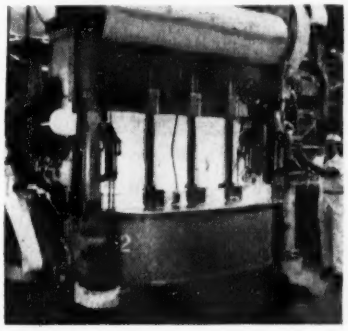
Power and lighting requirements are for the operation of 1,785 motors (having a total capacity of 7,335 hp.) and 4,713 lights (68,000 ft. of fluorescent tubing, 2,147 incandescent units). Distribution transformers are stationed throughout the plant. Entering voltage (4,160) is broken down to 440, 3-phase, 60 cycle, and 110v. single phase. Automatic capacitance relay control is used to open many doors through which material in process is moved.

Emphasis on Sanitation

To insure cleanliness in every phase of the operations was a primary consideration in the building planning—hard maple floors, consistent use of light colors, forced air ventilation, automatic door controls—all were chosen for their sanitation features.



BATTERY of 17 low-bowl dough mixers. Bowls, just 4 in. off floor, permit loading of minor ingredients at waist height, eliminate need of steps.



ON THIS NEW through-type mixer, spindles lower into troughs locked in position during mixing operation.

To keep the plant continuously in spotless condition, the company maintains a sanitation department with a staff of 74 employees. Large, built-in vacuum cleaning systems are provided with outlets throughout all warehousing, mixing, and baking areas to facilitate cleaning and keep particles of dust and flour from the surrounding air.

Hard maple flooring (197,000 sq. ft.) is kept buffed and polished by the Tennant system of floor maintenance, which eliminates the use of water and gives a highly polished surface. Electrically driven floor scrubbing machines are used for concrete and quarry tile flooring. Asphalt floors in the office areas and locker rooms are kept in top condition through use of waxing machines.

The plant maintains its own incinerator for easier paper and refuse disposal. Gases from the incinerator are water-scrubbed so that smoke, odors and fly ash is eliminated. Pans, cans, utensils are machine steam-cleaned. Each piece of equipment is cleaned and shined daily.

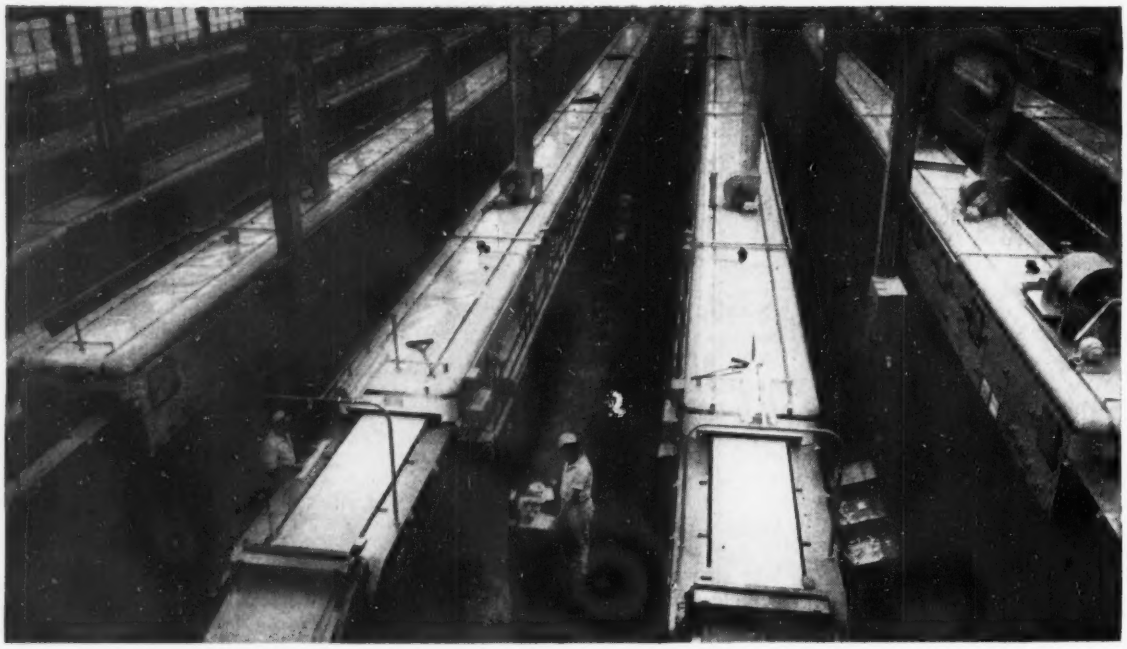
There are 15 engineers and 125 full-time machinists, oilers, carpenters, and electricians on the plant maintenance staff. Completely equipped workshops (5,400 sq. ft. of floor space) have facilities for handling every type of plant maintenance problem.

FROM precision rolled sheets of dough, this automatic unit cuts out crackers and delivers them in uniform rows to a continuous band oven.

How Raws Are Handled

The big production schedule and rapid turnover of supplies combine to make inflow of raw materials a major project. Total ingredients received monthly amount to 14,000,000 lb.

This steady flow of material re-



HEART OF PLANT is this battery of 12 streamlined continuous band ovens. All are 300 ft. in length; 7 are 32 in. wide, 5 have 38 in. bands. During an 8 hr. shift, one oven can turn out over 5 million crackers.

quires tremendous storage space. The quantities of prime items are received and handled in bulk form. Flour receipts alone exceed 9,000,000 lb. per month. Shortening receipts, slightly less than 1,000,000 lb., also come in tank-carload lots.

Shortening arrives in special tank cars, each consisting of a stainless steel tank surrounded by a steam jacket. The jacket, heated under instrument controlled steam, melts the shortening in each car, which is spotted at a designated place in the receiving area. Liquid shortening then moves from the cars, via a positive displacement pump at the rate of 60 gpm., into one of eleven horizontal stainless-clad, steel storage tanks. Each tank has a capacity of 9,900 gal. Tanks are located in the tower, where constantly controlled temperatures keep the shortening ready to be piped to the mixing department of the mezzanine floor. Coconut oils (two types) are also received in tank cars.

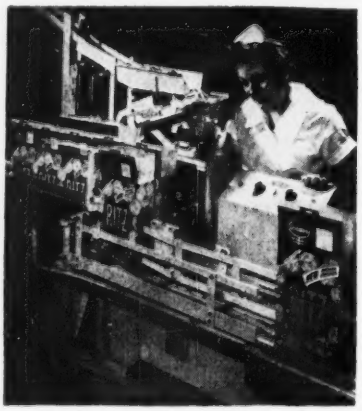
Molasses, invert sugar, and corn syrup also come in by tank car. These ingredients, likewise are pumped from the car, going to six horizontal, stainless-clad tanks in another section of the tower. Later they are piped to the mixing and icing departments.

Bulk sugar solids—2,500,000 lb. per month arrive in carload lots of 80,000 lb. each. This ingredient is moved via sanitary pneumatic tubes to the big steel bins in the tower. A mechanical spiral conveyor moves the sugar from storage bins to mixing machines as required. A separate pneumatic system carries sugar from the storage bins to smaller bins in the icing and sugar wafer departments for use in making syrups and icings.

FRESHLY BAKED crackers cascade from the band oven, are given a special spray, then continue 240 ft. in straight line on cooling conveyors.

From the company's own mill in Toledo, Ohio, 9,000,000 lb. of flour comes monthly to the bakery in specially designed hopper cars, held by Nabisco on exclusive lease. Unloaded from the cars at the rate of 20 tons per hour by a pneumatic system, flour is taken up to any one of 81 huge bins (7 ft. dia. each). Individual bin capacity is 125,000 lb.

There are two unloading pneumatic systems, both operated from a single electrically interlocked panel-board controlled by one operator. Equipped with high- and low-level indicator lights, this board reveals the conditions of the respective bins, which are



CARTONS are automatically filled. Check-weigher finishes job exactly.

equipped with material-level indicators. In the unloading system, three bins are serviced from a common header or receiver. Bin interiors are painted with a red plastic material. Color selection is an aid in cleaning operations, since any dust or flour remaining shows up fast by contrast. Flour is stored according to type—soft, medium, strong or graham. Temperature of the tower is thermostatically controlled through heating units, with air circulation to maintain uniform temperature between 70 and 80 deg. F.

Flour is moved from the storage bins by an ingenious, multi-level system of spiral conveyors. Here, too, sanitary design is accented. All conveyors have hinged bottoms that are readily dropped, exposing all surfaces of the movers for fast and thorough cleaning operations. All flour from storage enroute to mixing passes through sanitary, gyratory sifters.

Movement of flour through this system is controlled from an electrically interlocked panel-board located on the mixing floor. These spirals deliver flour to surge bins preceding the scales feeding the mixers.

The new bakery makes about 65 different items. Almost all require approximately the same baking process —using similar mixers, cutting and stamping machines, and ovens. After baking, "iced goods" are handled separately from plain cookies and crackers.

There are five general types of baked goods—crackers, cookies, cakes, sugar wafers, and zwieback toast. Crackers include such varieties as Premium saltines and Ritz. Cookies are plain sweet products, such as vanilla wafers, ginger snaps, and animal crackers. Cakes are cookies with embellishments—marshmallow or chocolate coverings, sandwiches with cream fillings, and similar products. The plant maintains a complete wafer bakery, with 13 modern sugar-wafer machines.

It also has a complete and separate bakery for making the zwieback (toast). This process requires a slow baking of loaves of special bread in a tray oven. Pans used are Teflon-coated to minimize sticking, speed operations, improve sanitation, and up product quality. After cooling, the loaves are sliced and enter the band oven for slow toasting. Slices emerge thoroughly dried and gently browned on both sides. This entire process from panning of dough through to packing the toast is completely roboted. Toasted slices are automatically stacked by air jet for easy pickup with tongs for cartoning. The product proper is never touched by human hands.

The recipe for each Nabisco product is a basic formula written by the production department. Baking schedules are arranged in advance, with the program based upon salesmen's orders. When the program is set, raw material requirements are scheduled and all other steps in production lined up.

Many ingredients—salt, soda, coconut, cocoa—are assembled in the mixing room from storage rooms. Some must be tempered for certain recipes. Special machines such as grinders that crush 50-lb. chunks of cheddar cheese for use in cheese items are also required. Industrial lift trucks are used to handle non-bulk items—chocolate, milk powder, paper.

The six major ingredients—two flours, sugar, water, syrup, and shortening—are automatically proportioned. Desired weights for a batch are set up on scale beams on the scale cabinet. Once the formula has been set, all the operator need do is push buttons and the ingredients are then weighed in sequence through a relay system that adds one ingredient after another until the individual batch has been completed.

There are two principal methods of dough preparation. Each has its own special type of mixing equipment. Time and temperature in the mixing of all doughs is rigidly controlled.

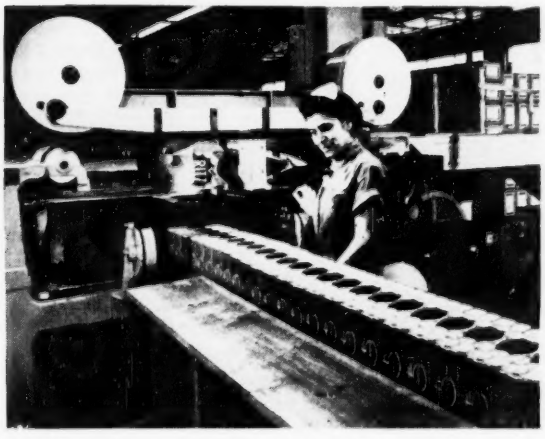
First, for sweet varieties preparation is in a battery of 17 low-bowl dough mixers (Readco). There are 14 mixers of 7-bbl. capacity and 3 of 4-bbl. in the battery. These mixers, designed especially for Nabisco, have new, improved features that simplify the job.

Bowl of the new mixer is only 4 in. off the floor. Minor ingredients now go in from the rear at waist height. Climbing steps formerly required are no longer necessary. Further, this single change in design—lowering of the bowl—removes an accident hazard, ups sanitation, and makes the work easier.

These new mixers are equipped with a motor-driven mechanism for dumping the bowls into troughs. The bowl crawls up to dumping elevation propelled by a separate drive on the unit. The mixers dump from the front.

Second, for cracker varieties, spindle mixers are employed. These units, also Nabisco design, are push-through types for straight-flow movement of the dough troughs.

Ingredients are put into a trough (capacity 1,500 lb.) mounted on wheels. And the unit is pushed into position and locked. Three spindle agitators are then lowered into the trough. Automatic timing devices control the exact number of spindle revolutions for each type of dough. Upon completion, the spindles are raised and an automatic ejector device on the unit moves the trough from beneath.



SEALED cartons are conveyed into this machine, which wraps them in bundles of four each.

ON SHIPPING FLOOR, merchandise is moved (by electric tractors) to freight cars and truck trailers.

A motor driven unit lifts the trough by forks to dump the dough down the chute to rolling and cutting machines on the first, or oven-level, floor. Each type of dough receives its own treatment as the mass is rolled and pressed into thin continuous precision sheets by the rollers. Chrome-plated rolls are employed to obtain accurate, smooth sheeting and to avoid sticking of the dough. Next, the sheet passes beneath aluminum cutters. Aluminum was selected for its light weight to reduce wear and tear on the drive mechanisms. The unstamped portion of the dough is automatically reclaimed.

Crackers on Parade

After they are shaped, the cookies or crackers travel in orderly rows on the baking bands and into the streamlined, gas-heated, 300 ft.-long ovens. Three types of bands or belts are employed in the ovens: Wire mesh for sponge goods, solid Sandirk steel for some sweet goods, and perforated Sandirk steel for other sweet goods—the perforations release steam under the cookies and give flatter bottoms.

Each oven is divided into seven separately-fired zones. Gas pressure to burners is adjusted manually and pressure automatically regulated as set. Ovens have safety devices and automatic ignition. Structurally, the ovens have a steel frame with a porcelainized sheet exterior surface and black sheet steel interior. Glass-fiber insulation is used between the sheets. These ovens were designed and built by Nabisco.

Speed of the band passing through the oven is adjusted according to the baking recipe. Vanilla wafers, for example, spend 7 min. in transit, while saltines travel the length of the oven in less than 3 min. During an 8-hr. shift, one oven will bake 5,000,000 saltines.

When products emerge from the oven, the next major step is proper cooling. Thus, freshly baked hot biscuits and crackers move from the bands to long, continuous belt conveyors. Here, too, speed is carefully regulated so that products are delivered to the packing tables at the proper temperature. From the cutters to the packing tables, crackers and cookies travel a straightline distance of 600 ft. Operators have a handy inter-communicating telephone system between the machine, end of oven, and packaging station on the line.

Cookies prepared for creamy filling or coverings are called base cakes. After leaving the ovens and cooling these cookies are delivered to the icing department. The marshmallow depositor employed is an Oakes machine. And here again is another innovation—for this unit has been augmented with an ingenious color mixer and a two-color depositor head.

The discharge line from this Oakes unit is tapped with a line leading to the color mixer. Regulation of a valve on the main line, beyond the tap, controls the amount of marshmallow passing through the color or branch line. Just prior to entering the mixer, the marshmallow in this branch line receives an injection of color solution. Then it and the color solution are continuously mixed in the color maker by paddles on a rotating shaft.

Product then continues to the color compartment in the depositor head. At the same time, white marshmallow is continuously being delivered to the depositor. Thus, both types—colored and white cookies—are produced on the same line.

After receiving the marshmallow, cakes travel through a tier cooling conveyor to "set" prior to packing. This conveyor has 12 levels, each 45 ft. long. In a period of 30 min., cakes travel a distance of 500 ft. through this unit.

Handling of the huge oven production of crackers and biscuits necessitated split-level packaging. One line is on the same floor as the oven; the other on the second or mezzanine floor, directly above the first. Unique machines break the sheets of crackers into neat rows, then stack the rows vertically (or otherwise prepare the products for packing).

Most of the crackers and cookies are now packed automatically—going from the cooling conveyors to the wax wrapper machine or directly from automatic filling machines into printed cartons lined with wax paper. All are untouched in the process.

Products like Ritz are accurately filled by weight-type fillers equipped with a vibratory dribble feeder to give correct scale within 1 or 2 crackers per carton. Exactness of these fillers has been found so satisfactory that continuous checkweighing is considered unnecessary.

Filled cartons move on conveyor belts from fillers to wrappers. Some boxes are prepared for wrapping by machines that fold the wax paper lining and cardboard carton top. These boxes are then covered with a printed wrapper, with Nabisco seal applied at either end. Both wrapped and printed cartons proceed into a machine that wraps or "bundles" a number together for shipping. Bundled goods are then moved to the shipping department on belt conveyors, some of which extend 450 ft. into the department. Here, they are placed on floor trucks and wheeled directly to freight cars or trailer trucks.

Total area of the shipping branch is 175,000 sq. ft. The enclosed freight car siding is capable of housing 13 railroad cars. A truck loading area large enough to handle 16 large trucks is also within the building. A fleet of electric tractors helps move merchandise around this area.

Area has own road system, and all cars and trucks come onto this system so traffic does not harrass the neighborhood.

All products are constantly examined for quality in the control laboratory. Moisture is checked every hour and the product rejected if not up to standard. Incoming ingredients, such as shortening, are also inspected.

The bakery maintains a modern medical department fully equipped and staffed by a trained nurse on duty at all times. Not only accident cases are handled here, but also free medical advice is given by an attending physician.

Employee Benefits

All employees must pass a physical examination before they are hired. Periodic checkups are scheduled thereafter. Under a participating group-insurance plan, the company contributes a substantial part of the premiums. Welfare insurance, paid for by the company, provides accident, hospitalization, and medical benefits for employees and their families, along with sicknesss benefits for employees. A comprehensive pension plan includes all employees, and its entire cost is borne by the company.

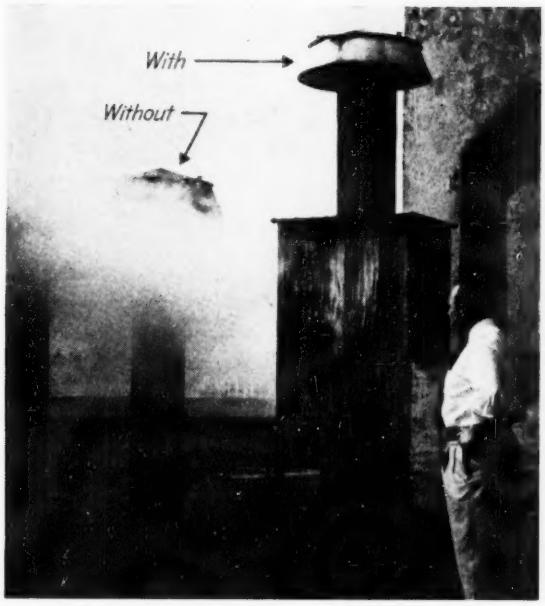
Employees work on 8 hr. shifts, wherein the company allows a total of 50 min. rest with pay. Rest periods are broken down as follows: Morning 10 min., lunch 30 min., afternoon 10 min. Among other personnel programs is a suggestion system with individual awards as high as $2,500.

Centrally located in the new building is a large, modern cafeteria having a seating capacity of 500. Meals are served to employees at moderate prices. The room is attractively constructed and furnished. Picture-windows run the full side of the room to make this area exceptionally pleasant. Furniture is modern. Chairs are chrome steel and leatherette; tables, chrome steel, Formica tops.

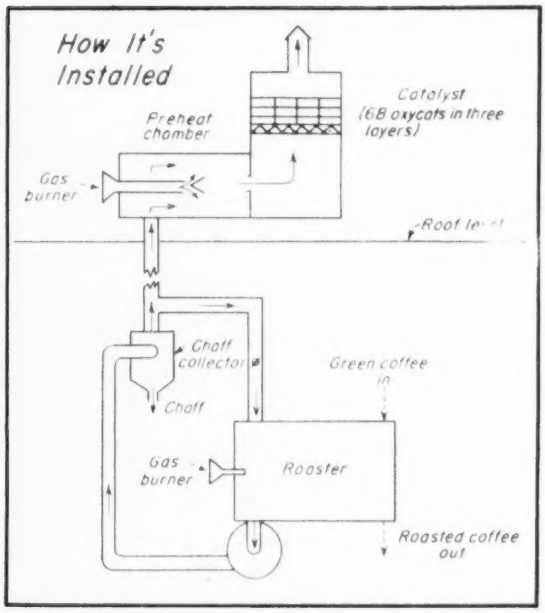
Modern sanitary locker and toilet rooms are centrally located in the new building. These rooms have glazed tile walls, terrazzo floors, and marble shower stalls.

Uniforms, provided for the employees, are changed twice a week and are laundered by the company.

The entire project was conceived and executed by the combined efforts of Nabisco's Engineering and Production Departments.



STRIKING COMPARISON. Using new anti-fume installation, stack (right) operates "clear"—in decided contrast to obnoxious smoking of unequipped unit (left).



SETUP of smokeless roaster. Effluent (steam, chaff, and volatile coffee smoke) is preheated, then combustibles are burned as they pass over catalytic beds.

Catalyst Curbs Air Pollution

Low-cost unit efficiently dispels objectionable fumes from coffee roaster . . . Is seen having wide food-field application

FE STAFF

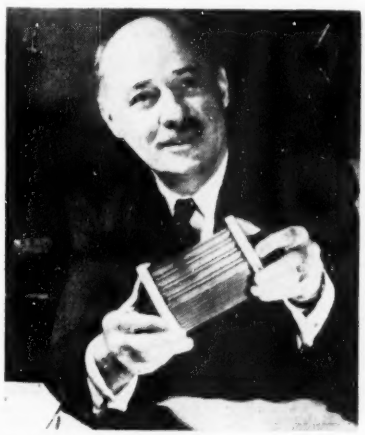
Air pollution—a serious community problem—is now being kept down by a new combustion catalyst.

First installation in the food industry is in one of the 14 exhaust stacks of coffee roasters at the Long Island City, N. Y., plant of Eppens, Smith Co., Inc., where it is effectively removing objectionable coffee smoke and odor. On the basis of its performance, this firm now plans to equip the remaining roasters with the catalytic equipment.

Key to the fume-control process is the Oxycat—a 5¼x3¼x3-in. unit—which comprises two thick porcelain endplates, a porcelain spacer bar, and 73 porcelain rods coated with a 0.003-in. film of catalytic alumina and platinum alloy. There are three layers of 68 of these catalytic units in the single exhaust stack.

The streamlined, tear drop-design Oxycat rods minimize resistance to air flow and expose a large area of the catalyst to the air stream. Combustion of gases and noxious fumes takes place at the surface of these rods and, it is stated, at temperatures well below the gases' normal ignition point. It is reported that stack temperatures may rise as much as 1,000 deg. or more due to the action of the new combustion catalyst.

Almost any oxidizable vapor or gas can be burned by the catalytic unit. It is, however, most effective on fumes that can be oxidized to water or carbon dioxide. These are the fumes that comprise the family of hydrocarbons—prime industrial source of air pollution.



INVENTOR Eugene J. Houdry holds oxidizing-catalyst unit (Oxycat).

Operating temperature range is 500 to 1,800 deg. F. In low-temperature applications, waste gases (as from coffee roasters) must be preheated to bring the catalyst up to 500 deg. F.

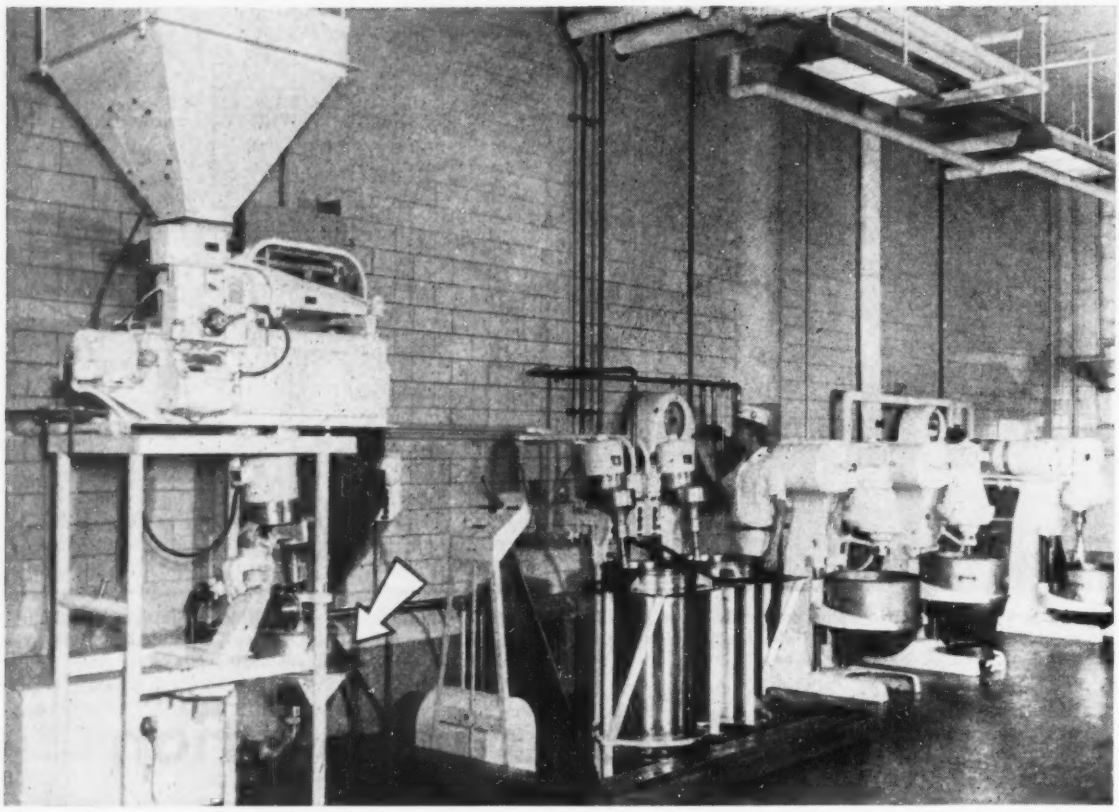
Cost of the single unit at the coffee plant is about $2,000. No limit has been set on the useful life of the Oxycat. Original catalyst installed at an oil refinery has been in continues operation for 7,000 hr., and it is reported to be as effective as when first installed.

Contamination of the catalyst by surface deposits (metallic oxides or organic coatings), excessive abrasion, or temperatures above 1,800 F. can shorten the life of the catalyst. Coffee fumes, however, do not affect its efficiency. Hence, the pollution control unit requires no cleaning.

How Coffee Unit Works

At the start of the roasting cycle, a 500-lb. batch of green coffee beans is dumped into the Thermalo roaster. Here, the beans are tumbled while slowly roasted for 20 min. to the

(*Turn to page 133*)



ACTION: Cake batter is made continuously. Liquid and plastic ingredients are prepared in kettles (right), mixed with water in tanks (center), then metered to continuous pre-blender (arrow), where they meet stream of flour from weigh-feeder (just above). Pre-mix is then pumped to final mixer on floor below.

CONTINUOUS MIXING

¶ Slashes operating costs

¶ Handles liquids, plastics, drys

¶ Insures finished-food uniformity

JOHN A. ABBOTT

Sales Engineer, American Machine & Foundry Co., Bakery Equipment Division, New York City

Reductions in operating costs and improvements in product quality are among the outstanding benefits resulting from application of continuous mixing procedures to many food processing operations.

In the case of thin liquids, the problem presents no special difficulties.

But unfortunately for many food manufacturers, the materials usually encountered are thick and heavy—like a peanut butter and bread dough. Or they are plastic—like butter.

To do an efficient mixing job with such materials, a wide variety of machines has been developed. Many of these operate on a continuous-flow basis whereby proper proportions of all ingredients are fed to and withdrawn from the mixer at the same rate.

Most of the continuous mixers have relatively low hold-up compared with batch mixers. That is, where a batch operation may have a total cycle of 15-20 min., the length of time material is in the continuous mixer may be a fraction of a second or 2-3 min. at the most.

Different Operations Performed

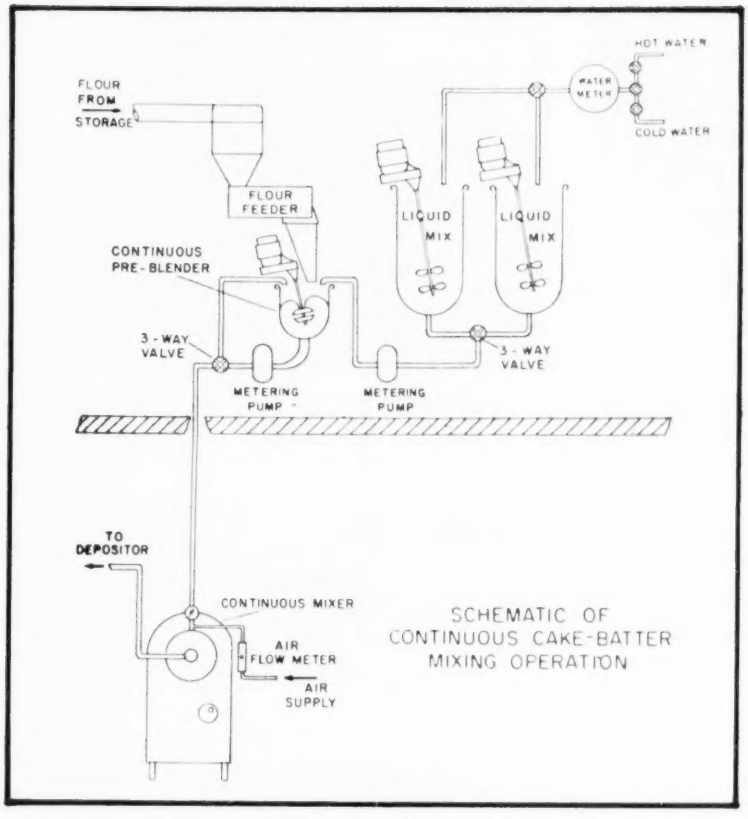
There is also little or no recycling of material in continuous units. Thus, in one single pass through the mixing chamber, all of the material is subjected to the same mechanical action, and uniformity of product is increased.

One basis for classifying continuous mixers is by physical state of materials fed and discharged.

Here, we would first have mixers for dry materials only, such as flour. These would include the spiral ribbon type blender bins, and the one-pass high-speed mixers such as the Entoletor.

For heavy pastes on the verge of non-pumpability, we have screw-type continuous mixers or pug mills that can handle both wet and dry materials and form them into a consistent plastic mass.

If wet and dry materials are to be mixed continuously and the resultant



BLUEPRINT: Location of various metering devices is shown in this working layout of continuous cake-mixing operation. Also seen is 3-way valve that enables recirculation of the pre-mix when desired.

mixture is pumpable, it is frequently convenient to use a twin disk-type impeller in a symmetric bowl. In this case, action of the special impeller maintains a deep vortex with strong agitation so that the dry materials are continuously incorporated in the mix. Where the liquid pre-mix is very thin and pumpable less specialized agitators may be used.

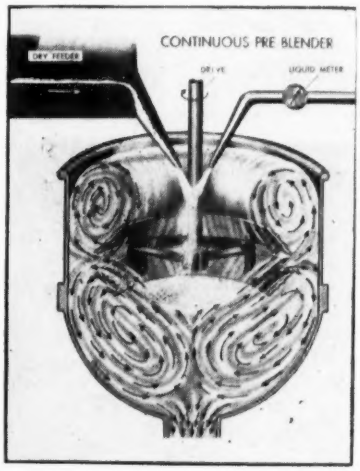
Easily Pumpable Products

For doing a final mixing job on materials which are liquid or fluid enough to be pumped easily, there are a variety of continuous mixers available, depending on desired results.

Homogenizers are used where intense shear action is desired. Here, a positive displacement, high-pressure type pump forces a liquid pre-mix of all ingredients through a very small orifice.

The shear action induced by the jet is effective in forming oil-in-water emulsions by dispersing the oil particles so well and so finely that they do not re-agglomerate. One important application of this unit is in preparation of imitation whipping cream. A stable emulsion very similar to natural whipping cream is formed of shortening, water, sugar, and powdered milk.

Another type of machine widely used for high shear action is the so-called colloid mill. Shear is produced by a rotor disk operating within a stationary member, with feed materials flowing between the two. Clearance between rotor and stator faces is adjustable to give desired intensity of action, and may be varied from 0.001 to as high as 0.02-.03 in. Throughput rate is variable over a wide range and, in many models, a variety of mixer-surface construction is available to achieve desired results.



HOW pre-blender operates.

Colloid mills are used in preparation of those cereal products where it is desired to homogenize a water paste and reduce agglomerate size.

Oil Particles Coated

They also find applications in the preparation of mayonnaise and salad dressing by continuous processes. In this case the object is to form an oil-in-water emulsion by subdividing the oil particles to as low as 1 micron average diameter. In the mixing process, the oil particles are coated with the emulsifying agent; in the case of mayonnaise, with egg yolks. The mill is usually fed by pumping from one of two alternate liquid pre-mix tanks each of which is equipped with portable agitators.

Another mixer type, which was originally developed for making marshmallow candy, has been applied to cake and mayonnaise. Construction could be compared with that of a colloid mill in that the material is passed between a rotor member and two stators. However, clearances are much higher and the rotor and stators are equipped with concentric rings of teeth in an orderly way so that the action is extremely effective for dispersing gas in large or small percentages.

Rotor speed is variable. Liquid materials are fed by a sanitary type positive displacement pump, and gases such as nitrogen, when used, are metered with a rotameter. Advantages of this mixer are high flexibility, adaptability to different products, and ease of dismantling for cleaning.

Heat Transfer Plus Mixing

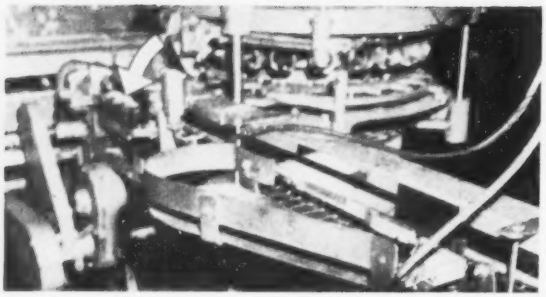
So far the units mentioned have been of the extremely low hold-up variety—a residence time up to 1-min. —wherein the object is mixing *only* and where a high rate of heat transfer is not particularly required.

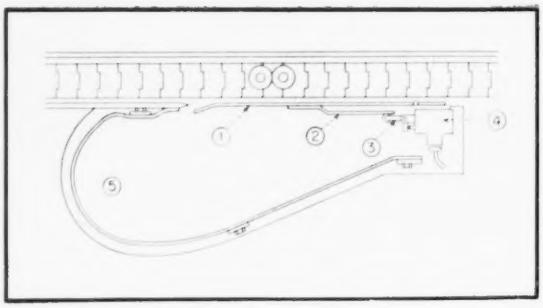
Where it is desirable to heat or cool a plastic mass quickly and continuously, the Votator type mixer is very useful.

In its simplest form this unit consists of two long, concentric cylinders with a scraper type agitator in the inner cylinder. Material is pumped through the inner tube, and heating or cooling medium passes through the outer one.

Heat transfer is efficient because the surface on the side of the plastic material is continuously scraped clean. In

(*Turn to page* 134)





1—Ends glass-jar breakage

They Do Things the *Easy* Way

10—Improvements—10

—by which Gerbers ups packaging-line efficiency, eliminating jar-smashing jams, advancing control, adding to cleanliness, bettering inspection, simplifying stacking, and promoting worker safety

IVAN C. MILLER
Associate Editor, "Food Engineering"

Ten important additions to glass-jar packaging lines at Gerber's Baby Foods, Freemont, Mich., now assure high-speed filling, closing, retorting, labeling, and casing, with minimum interruptions in production or loss of product.

Most of these trouble-ending devices—installed at small cost, and requiring but little engineering skill to apply and operate—invite the sharp attention of other food manufacturers as means by which they, too, can curb similar packaging-line ills and insure uninterrupted production.

Here, now, are the 10—each related by number to graphic illustrations:

1. Control Relieves Congestion

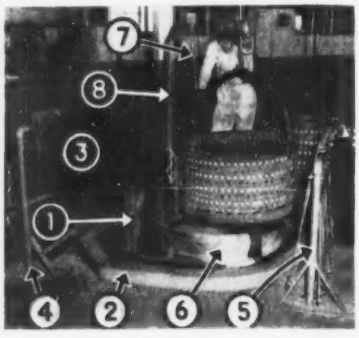
First addition in sequence of operations on the baby-food in-glass line, prevents breakage of jars due to jams at the filling machine.

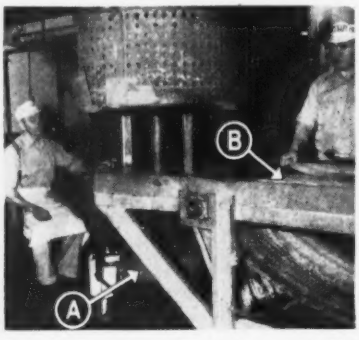
On those occasions when a filler is automatically stopped, or when it is necessary to interrupt the filling operation, jars continue to feed from the unscrambler. Glass breakage from the resulting jam would then be imminent—were it not for a special control arrangement which interrupts the supply of jars before dangerous pressure can build up. The easily installed control functions in this manner—

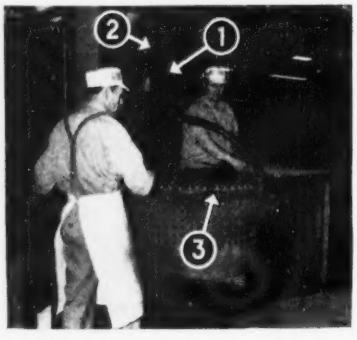
Ahead of the worm-type filler feed-index (see photo), one side of the conveyor guide was removed and replaced by a hinged strap—(1) in sketch. Attached to the outside of the hinged guide-rail section is a spring steel extension (2) which, when the guide is deflected away from the conveyor, due to congestion, presses against a pivoted rocker arm (3), causing latter to actuate a micro-switch (4). Closing of the electric circuit stops feed to conveyor.

When, due to jamming, the hinged guide is forced away from the conveyor, a passageway is opened between the ends of the hinged and the permanent guide. Through this opening remaining jars on the conveyor can escape to accumulator platform (5), thus emptying conveyor and relieving pressure which might otherwise cause jar smashing. The accumulator is of a size ample to handle line operation at capacity.

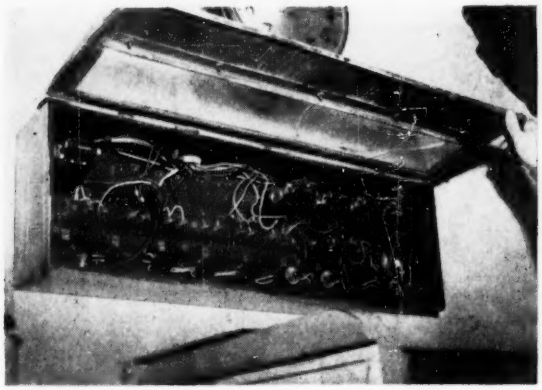
Feed to the conveyor can be resumed only when con-

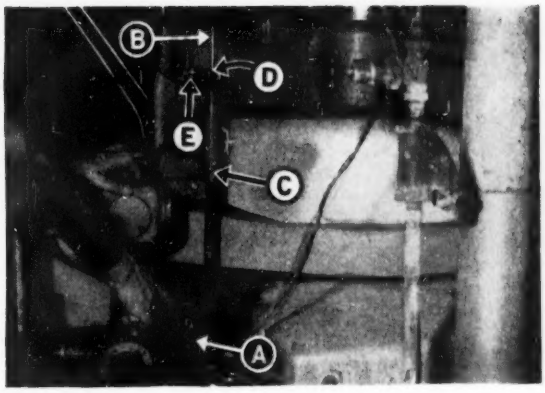






3—Crate-handler made from fork-truck lift assembly





2—Central count covers five lines

gestion is relieved sufficiently to permit spring-actuated guide rail to return to normal position.

2. Counters Aid Accounting

As filled containers are star-wheel-fed into closing machine, each in turn actuates a control device which registers on an automatic electric tabulator. Counters for each of five filling-closing lines are remotely located, behind glass, on a common panel (see left photo). Here, where injury to counters is unlikely, tabulations for all runs are conveniently accessible.

This is how counting system operates—

As each jar is rotated into the closing machine, container operates a pivoted lever—(A) in right photo—which, when the jar moves on, is returned by spring action to former position.

Lever, attached to a vertical rod (B) supported in a housing made of a length of pipe (C) actuates a cam (D) mounted on top of the housing. Throw of cam closes the circuit in a micro-switch (E) to register a count on the electrically operated tabulator (seen in previous photo).

Comparison of recording of a counter with initial jar volume on line—determined by count of empty container cases—indicates any loss between unscrambler and closing machine. Finished-product case count, compared with counter record, indicates jar loss between jar-closing and case-closing operation.

3. Truck Lift Serves as Crate Elevator

Delivering filled retort crates to packaging lines on first floor (following the cooling operation on second floor) and returning the heavy empties was a dangerous procedure before lifts, made from discarded fork-trucks, were permanently installed to lower filled crates and return empties.

When in elevated position, fork-lift—(1) in left photo—extends through curbed opening (2) cut in second floor. If not in use, opening is made safe by closing heavy-gage metal covers (3) hinged to guard-rails (4). The latter serve several functions, including handy collection (5) of crate rods.

Circular guide (6), permanently mounted on forks of lift, insures accurate centering of crate, a requirement for efficient unloading of contents.

When crate is properly located, fork assembly is raised to seat unit. Then crate rod can be removed and replaced by hook (7), which is attached to an arm (8) extending out from lift.

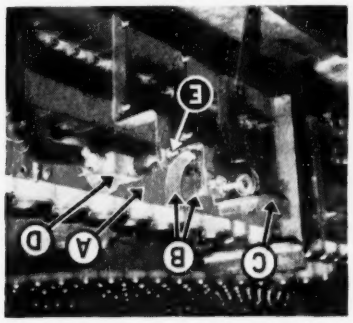
Installed was a readily operated and accurately controlled hydraulic system for raising and lowering forklift. Hydraulic pump and motor of driving assembly serve a two-fold function—that of operating the between-floors elevator and also powering the plunger—(A) in center photo—of crate unloader. Successively, latter lifts each layer of jars in a crate to the level of the discharge conveyor (B).

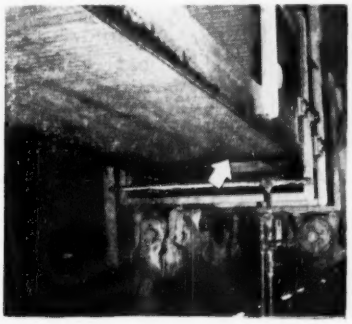
Bottom of crate, which is not attached to unit, rests on a lip projecting in from the side of the crate. By this arrangement, contents of the crate may be elevated to conveyor level, layer after layer, while the crate remains stationary. Supported by crate hook—(1) in right photo—and overhanging arm (2) extending from elevator, upper rim of crate (3) is held at the height of discharge conveyor belt.

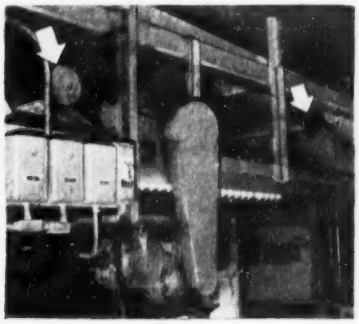
Each layer of jars is separated by a perforated metal plate, from which entire level of containers is racked off as a unit onto conveyor at start of packaging line.

4. How Conveyor Operation Was Smoothed

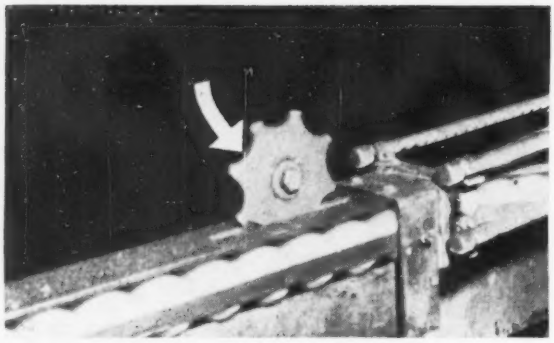
If down-time losses are to be avoided, several requirements must be met by the unit that receives jars from crates and delivers them onto the labeling line. Crate



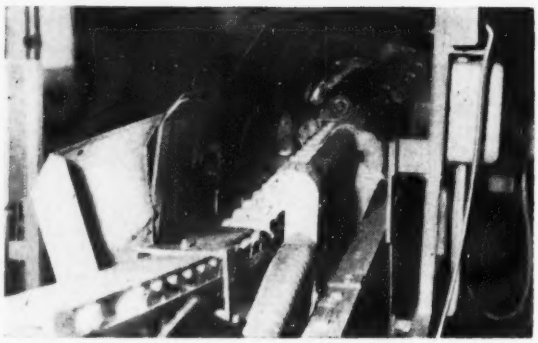




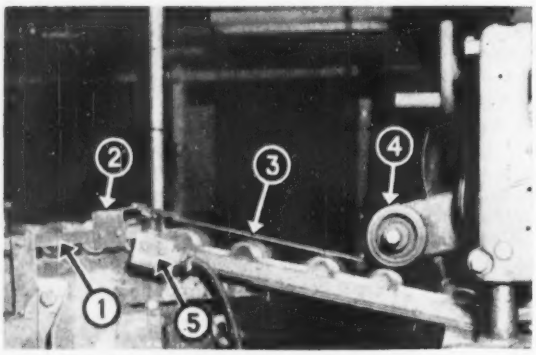
4—Stops conveyor slack, controls unscrambler load, curbs congestion



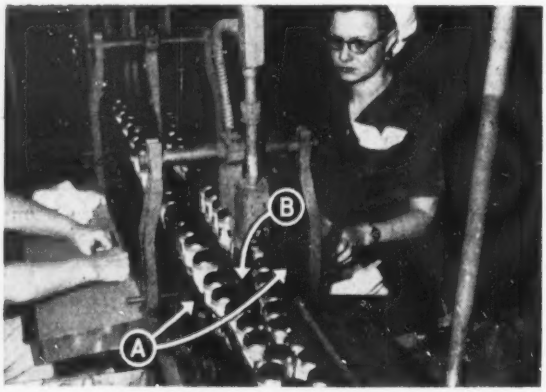
5—Rejects end-first jars



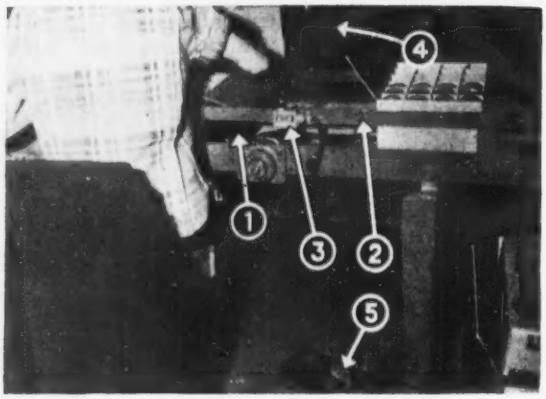
6—Homemade jar cleaner



7—"Riding-jar" trouble cured



8—Divider benefits inspection



9—Better empty-case control

unloading is necessarily intermittent to allow time to raise empty crate to floor above, then to load and lower filled crate. Therefore, the conveyor must serve as an accumulator to provide uninterrupted 500-per-min. jar flow.

The large area of conveyor, necessary for accumulating, introduced a problem of slack in the belt, attended by surface irregularities and occasional lurching. If not broken, fallen jars cut production.

Merely by placing a disk-capped large-diameter steel shaft (see left photo) on lower belt loop, slack is confined to return travel, thus stretching the top surface smooth. Held in place by the end caps, shaft rolls with the belt. Jar toppling is now rare.

From the accumulator, jars are single-filed by an unscrambling unit onto the conveyor to the labeler line. Formerly, unscrambler feed and accumulator were the same belt, which moved at fixed speed. And with this arrangement, any interruption along the labeler feed line prevented flow from the unscrambler. Then pressure from jars racked from crates built up. Result of the two-way squeeze was excessive jar smashing.

This condition was easily remedied by two simple measures. The travel of jars from crate to unscrambler is now made in two steps on two different conveyors, driven by separate motors and spaced by a dead-plate (center photo). When unscrambler's own feed belt is stopped, accumulator fills up behind the dead plate before any excess pressure can be exerted on jars at the unscrambler. Crate emptying operation is unhampered, however, because of capacity of accumulator.

Dangerous pressure build-up between labeler and unscrambler is prevented by automatically stopping unscrambler and its feed belt when jars aren't free-flowing.

Control method employed is similar to that for governing the flow of empties to the filler, with this difference. Though unscrambler and feed-conveyor motors are stopped instantly with only slight back-pressure, no escape for jars is provided—they are kept in line.

Immediately after glass containers are transferred from unscrambler to single file conveyor, they pass the control station, where a section of the guide rail—(A) in right photo—is hinged and held in place by springs (B).

Side travel of guide, in event of congestion, is limited by a stop (C) to a narrow angle that confines jars to conveyor. Mounted on the guide rail is a micro-switch (D). When actuated it stops unscrambler and feed.

Control button of micro is operated by contact against a bolt (E), which can be adjusted and locked in position for sensitive operation of the switch.

5. Kicks Off Misaligned Jars

Despite the fact that precautions make toppled jars rare, once in a while one does overturn. To remove from

the line a jar sliding end first along on its side, a slot was cut in the bottom of conveyor chute. Opening was made wider than jar width but narrower than the length of a jar. Thus rolling jars should clear the opening but side-sliding jars drop through.

Results were not always in accord with theory. Pressure on both ends of the sliding jar, by the jar ahead and the one behind, carried the offender suspended past the slot.

Addition of a star-wheel (see photo) above the conveyor, rotating on a horizontal axis, now assures that any end-wise jar will be pushed through the opening. Wheel is rotated by rolling jars, its points protruding between them. But points are engaged by an end-wise jar, thus forcing latter through outlet.

6. Plant-Built Jar Cleaner

Adequate cleaning of glass containers has two major assets. Labels are effectively applied when jar surface is spotless, therefore both labor and label costs are lowered. Furthermore a thoroughly cleaned jar retains a fresh appearance for a longer time on the dealer's shelf.

Extensive laboratory tests determined the requirements for an automatic jar cleaning machine. Then after prolonged designing, coupled with machine shop and plant proving, a unit was developed. And it does the job expertly. Here is how the machine is constructed, also, details of the cleaning procedure:

Spray washed jars enter the machine (see photo) rolling on their sides. Here, streams of clean air from turbo-blowers are first directed at an angle against jar lids to blast away excess moisture. Two additional series of jets also blow angling streams of air to remove surface-moisture from sides and bottoms of jars.

Though most surface liquid is blown away, remaining is a film, which if not removed will reduce labeling efficiency and mar jar appearance. First step of several for cleaning away this film is a rigorous scrubbing of all jar surfaces with high speed rotary brushes.

Next, the just-described cycle is repeated, this time, however, with heated air from a second turbo-blower. During the second series, all remaining moisture is evaporated, while any dry film or smoky residue is polished away by the second battery of rotating brushes.

Jars exit sparkling in appearance and with thoroughly clean surfaces for most effective labeling.

7. Puts an End to "Free Rides"

On occasions in the past, a jar would be squeezed up between neighbors at the approach to, or somewhere along, the fast-tempo spacing-conveyor that feeds jars into the labeling machine. Least that could happen, when "free riding" occurred, was a smashed container, and too often production stopped.

Now that a simple but effective control has been added, damage and hold-ups from this source have vanished.

On conveyor discharging onto the spacer, the guide rail —(1) in photo—was fitted with a length of 2 in. strap-iron (2) bent at right angles. Bolted to the horizontal section of the strap, which barely clears jars, is a hinged lever (3) extending almost to labeler's clearance-roll (4).

Free-swinging hinged-lever is held clear of jars rolling on spacer by resting on the contact of a micro-switch (5), thus closing circuit to the motor which drives the clutch operated spacer-belt.

With this arrangement, spacer feeds jars to labeler at top speed so long as micro is closed. However, a "free rider", squeezed up between two jars, lifts the lever, opens the micro's circuit, and throws out the clutch driving spacer belt. Then, free rider drops in place.

8. Lines Divided, Inspection Improved

Separating a double line of jars into two parallel single lines has made it easier to detect loo e or imperfectly applied labels. Lines are divided and spaced merely by bulging out guide rails—(A) in photo—and centering between them a simple prow-shaped prong (B).

Before divider was installed, line moved jar-to-jar, so that "the other side" was never visible to either inspector at the station. Now, one inspector can see one side of the jars on both lines, the other inspector sees the opposite sides.

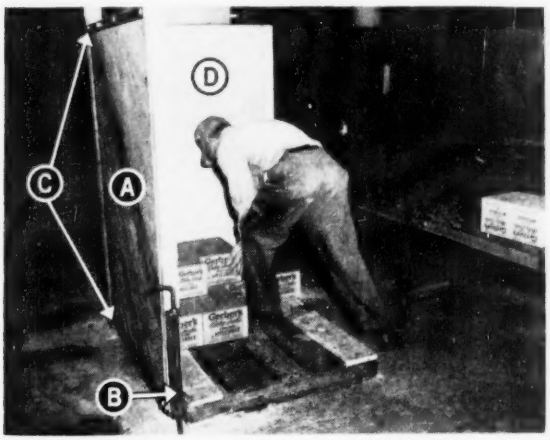
9. Ends Jam of Empties at Case-Filler

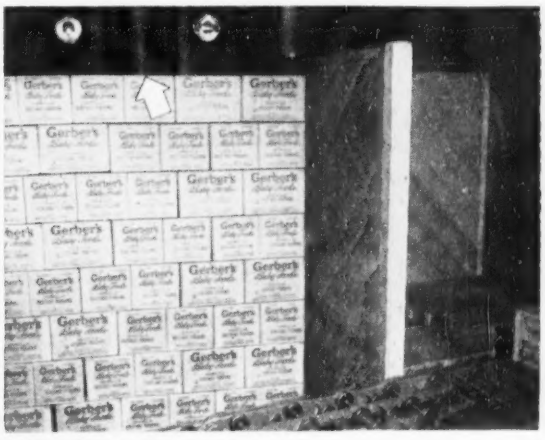
Too frequently the supply of packing containers, arriving by line-belt conveyor at the automatic case filling station, exceeded demand. It was then necessary to stack them on the floor, cluttering work space till the end of the run.

Control of case arrival (the equivalent to synchronizing two lines) was accomplished by merely installing micro-switches in motor circuits. This is how controls operate and how line flow is now synchronized:

Empty cases are conveyor-delivered from the floor above to a dead-plate between conveyors running at right angles to feed empties to two automatic case-fillers. As an empty is hand shifted clear of dead-plate—(1) in photo—operator flattens near carton flap over conveyor rail (2).

(*Turn to page 133*)



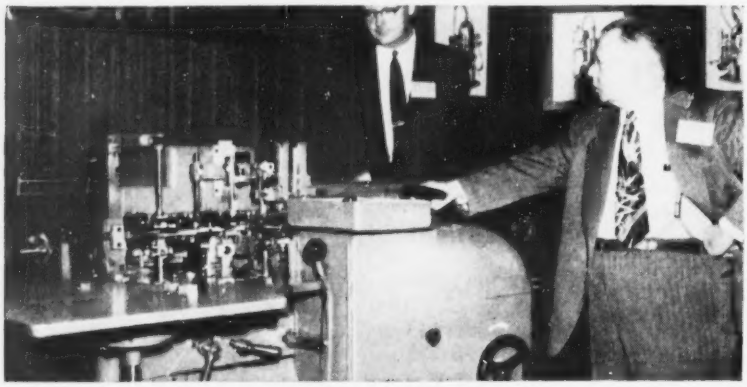


10—Perfect stacking made simple

Foreign Units Accent NCA Show

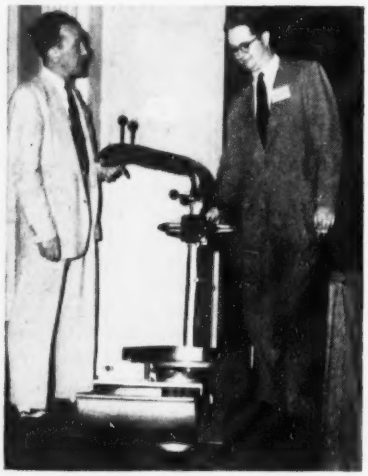
Among candy machines unveiled are new chocolate packer, wrappers, enrobers, pump, vibrating sieve, mixer-cooker, and tempering unit

NEWEST unit displayed by J. W. Greer Co., Cambridge, Mass., is for stock-box packing of chocolates. Featured is vibrating belt, automatic feeding of cards from magazine, and drive varying with speed of cooler. (70A)

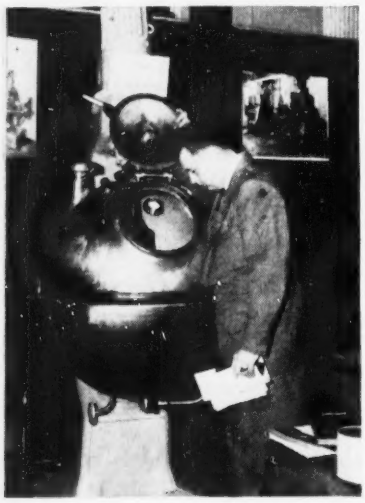


FOIL WRAPPER has speed of 100/min. Unit also applies printed, glued band around foil-wrapped chocolates. Rotary feed disk is quickly changed to handle various sizes and shapes.—Vacuum Candy Mach'y. Co., N. Y. C. (70B)

LOW COST chocolate dipper enables one girl to turn out 150-300 lb. a day. In place of wire-mesh belt, unit has reciprocating steel fingers.—Le Roy's International Research Lab., Point Pleasant, N. J. (70C)



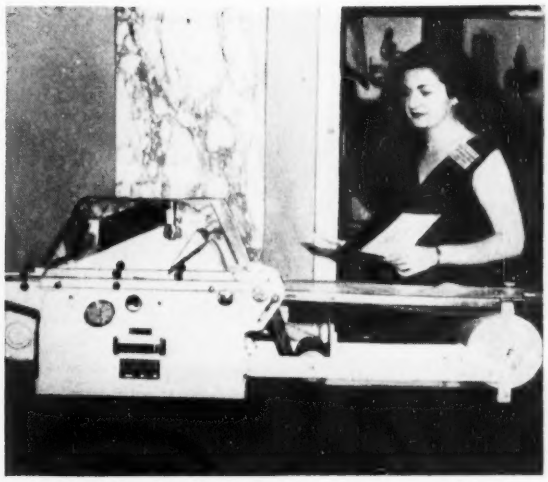
12,000-LB.-PER-HR. portable pump is designed to empty chocolate from conches or feed to tempering unit. Jebez Burns, Inc., N. Y. C. (70D)



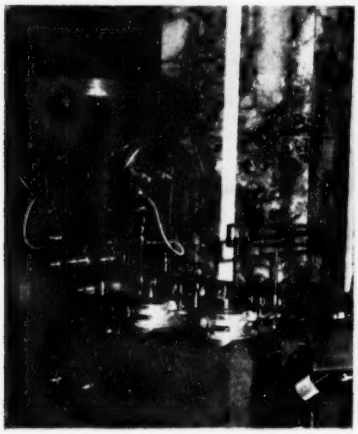
HIGH SPEED mixer-cooker handles four 220-lb. batches hourly. Double-arm agitator operates speedily in closed kettle. Vapor outlet permits removal of steam from cooking room.—Geveke & Co., Inc., N. Y. C. (70E)

Want more information about any items in this picture article? Just circle key number (in parentheses at end of each caption) on the Reader Service coupon on page 157

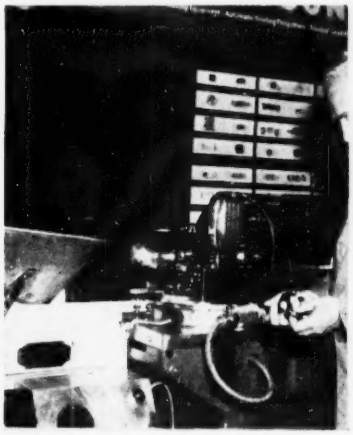
VIBRATING SIEVE, driven by small motor, removes oversize particles from chocolate leaving refiner or going into tempering unit.—Jebez Burns & Sons, N. Y. C. (71A)



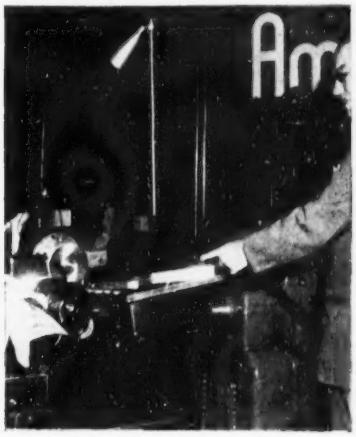
BABY ENROBER features blower, shaker-turnover devices, and electrically heated hopper. Made by A. E. Nielsen, Holte, Denmark, distributor is Geveke & Co., N. Y. C. (71B)



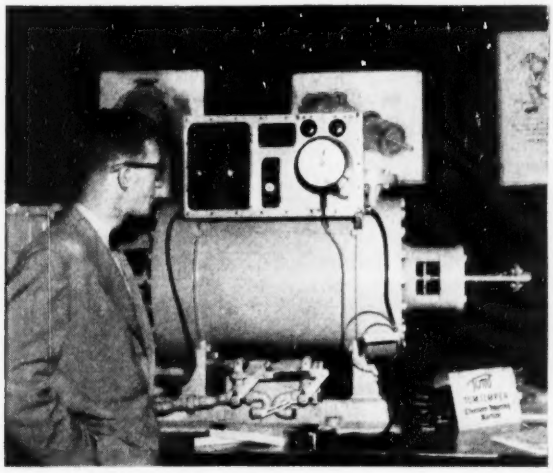
VERTICAL batch roller handles 13 lb. of soft centers a min. Unit features automatic cut-off device. Maker: American Mach. & Found. Co., N.Y.C. (71C)



TWIST WRAPPER has automatic vibrator feed device that delivers 200-250 candies per min. to rotary feed. Amer. Mach. & Found. Co. (71D)

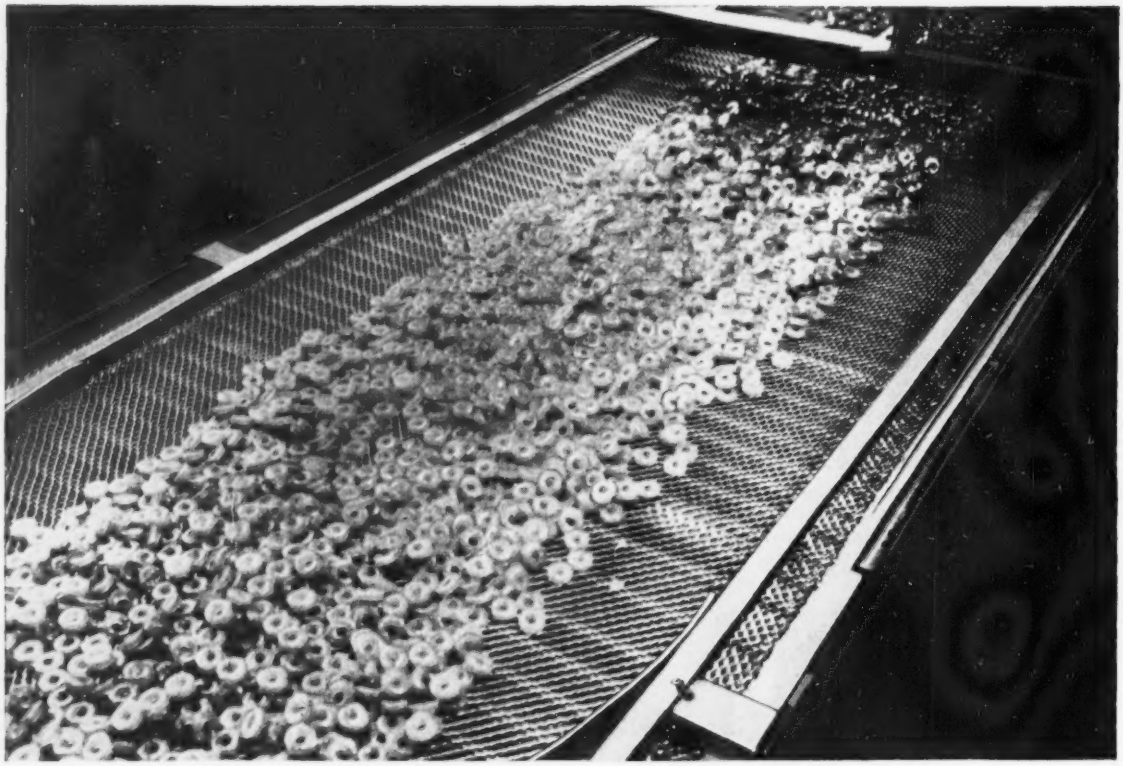


AUTOMATIC feeding device for twist or fold wrapper was displayed by American Mach. & Foundry Co. Unit also has special cut-off table. (71E)



CONTINUOUS, water-cooled tempering unit handles 15,000 lb. of chocolate an hour. Tempers within ½ deg. F. accuracy. Maker is Toms Lab., Ltd., Copenhagen, Denmark. Distributor: Geveke & Co., N. Y. C. (71F)

CANDY WRAPPER comprises new box-type gravity feed delivering candies to double-pocket rotary disk going to second disk with rotary leveling brush. Displayer: Package Machinery Co., Springfield, Mass. (71G)



STATIONARY GUIDES prove very satisfactory in keeping flat-surfaced candy on belt.

WIRE BELT CONVEYORS

How to Choose Them . . . How to Mount Them

PART II—Prime points on retaining selvages, surface attachments, and dividers . . . Belt installation and adjustments . . . Cleaning and maintenance, plus tips on care and protection

J. F. REID
Cambridge Wire Cloth Co., Cambridge, Md.

Food plant adaptation of wire mesh conveyors, to all the many and varied tasks assigned the units, would not be possible were conveyor installations limited to flat, free belts. Many special selvage weaves, plus a host of cross-belt and edge attachments, greatly extend conveyor versatility.

As has been mentioned,* wire belts are flat and always driven by flat-surfaced, straight-faced pulleys (newer crowned). Since troughing is not practical, due to rigid cross-member structure, other provisions are made to confine conveyed products to the surface of the belt or to permit increased depth of charge.

Sufficient for confining rigid or firm-type products are retaining angle-iron shoulders suspended over the belt an inch or more in from each edge. They are anchored to the conveyor frame, and their fence-like arrangement is stationary while the belt is in motion.

If angle-irons are too close to belt level, wear may result, while if elevated too high, product may be crushed between shoulder and belt surface. Damage is most likely when soft products are conveyed.

Retaining Selvages and Edges

Normally, edges of a belt have one of two selvages. On edges of some weaves, wires are knuckled-in, on others welded. Among the several ways of reinforcing edges and at the same preventing cross rod movement, the simplest method is to loop ends of cross members to spirals.

Retaining edges are added to belts by turning up selvage, weaving wire spirals along the sides, or "hair-pinning" cross-members and bending them up. When size of units transported is larger than openings in side fabrications, this type edging is adequate.

Many attachments are available for retaining products of small size. Among them are flexible conduit and a variety of side plate setups, some of which permit reverse bending required by certain drive arrangements.

Cleats and Dividers

Most food products can be elevated on the surface of the belt if the incline does not exceed 28 deg. When the climb is greater, or when products that roll are transported, addition of cleats becomes necessary.

*Part I, FE July, p. 90

These may be of wire fabrication, woven into the belt, or may be formed by attaching angle-iron or "T" cross-members to the carrying surface of the belt. Type, height of cleats, and distance apart will depend on the nature of the product, the processing operation, and the angle of elevation.

For some operations, such as trimming and cutting, a divided belt is necessary. A stationary divider, suspended over the conveyor, may be employed. Or the belt may be divided by plates similar to those used for retaining edges. A type of construction is available for belts on which different products are separately transported.

Installing Belt

After a preliminary checking of the alignment of terminal and snub pulleys and support rollers, belt may be laid in place on conveyor frame and made endless by attaching ends together. Instructions are provided by fabricator for making each weave of belt endless.

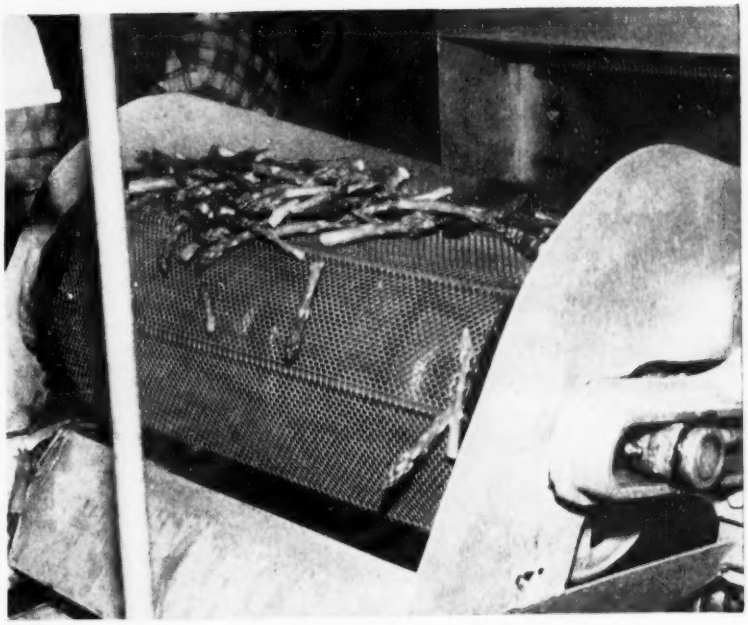
Belt should then be operated slowly and with slack tension to permit careful inspection of its entire length. Some spirals may be turned on edge during shipment or installation. All such up-ended lengths must be flattened before conveyor is started.

It is only after all individual spirals are properly seated that travel should be checked and adjustments made. Then when belt is properly aligned, operating tension can be applied.

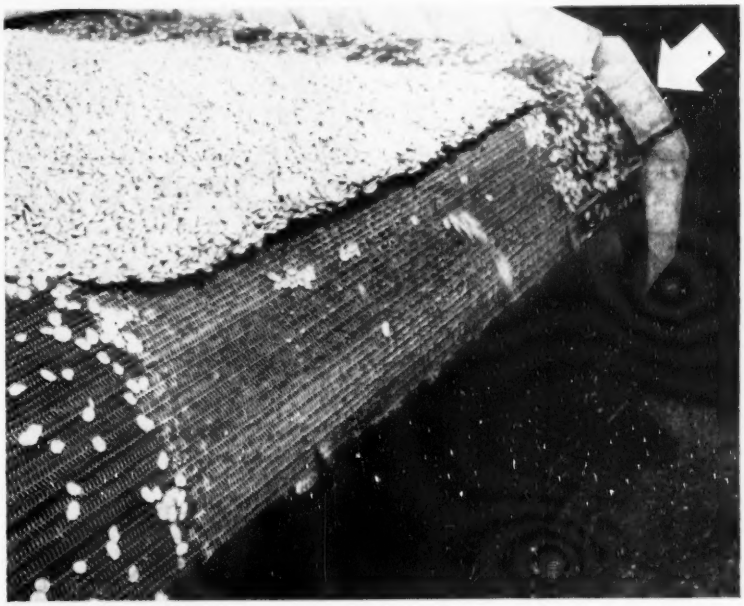
Too much stress cannot be laid on the vigilance required when starting a new belt. Ultimate life often depends on details of installation and preliminary operation. When adjustments are necessary they should be made—but always on the horizontal—never vertical.

Since tendency of mesh belts is to travel at exact right angles to the shaft of a snub pulley or supporting roller, direction of belt travel can be deflected by adjustment of either. Although alignment is most effective

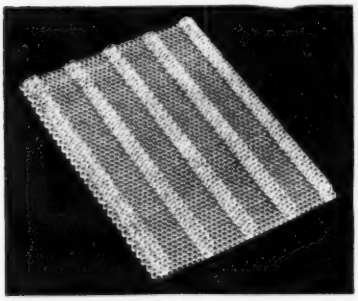
(*Turn to page* 178)



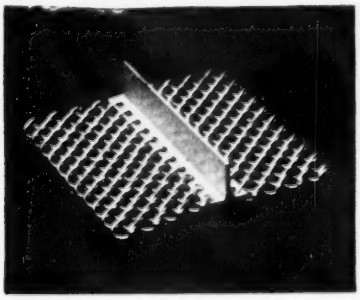
NO CLEATS needed to lift asparagus at slight angle for draining.



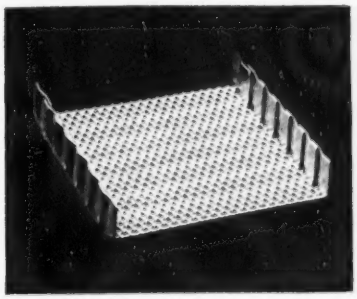
METAL edge-plates (arrow) prevent spillage of limas during freezing.



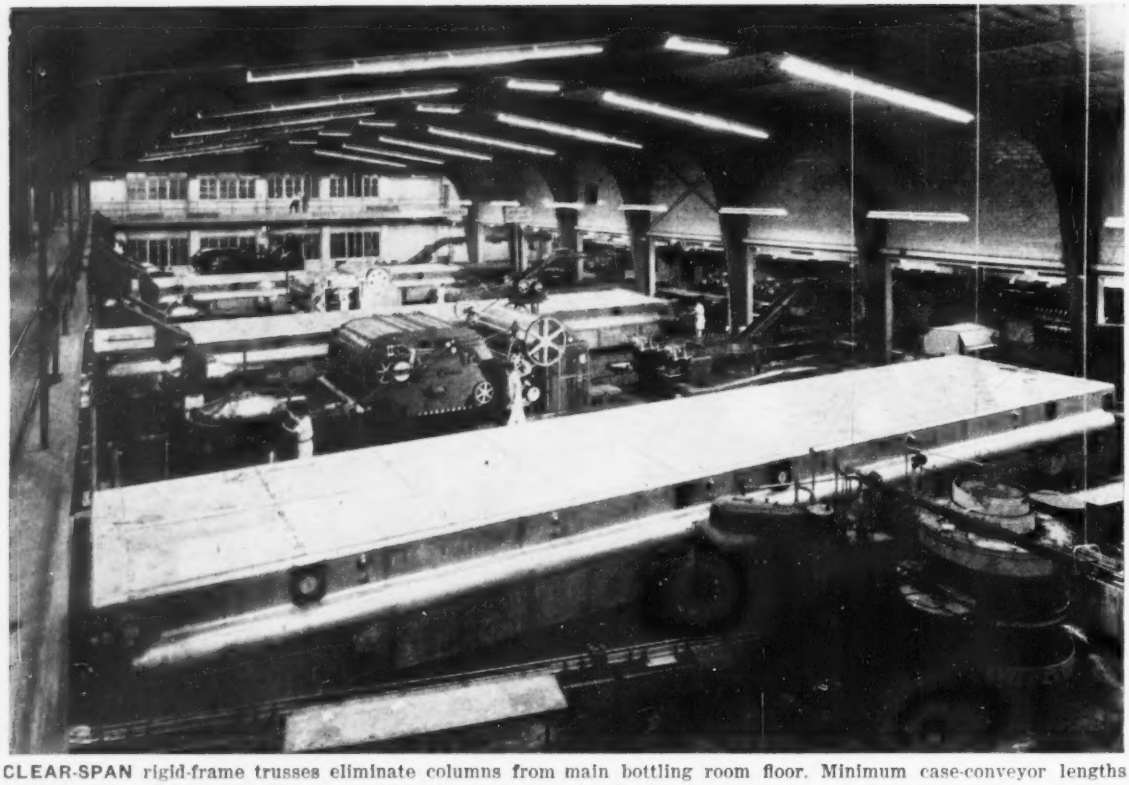
SPIRAL-WIRE CLEATS can be woven into the belt.



METAL "T" or angle prevents rolling during steep climb.



HIGH EDGES hold load-in-depth without risk of spillage.



CLEAR-SPAN rigid-frame trusses eliminate columns from main bottling room floor. Minimum case-conveyor lengths on floor add to better sanitation by making cleaning work simpler, easier.

Triple-Action Operating Efficiency

Through: ★*Equipment* . . . ★*Control* . . . ★*Safety*

Sound engineering meshes the three for highest performance at Labatt's new bottling plant . . . Functional innovations mark structure . . . Swift handling, A-1 product quality, top sanitation, optimum working conditions are stressed

SPECIAL ATTENTION to proved working fundamentals keeps on paying the high dividends. Most recent verification: The lofty production scores being chalked up at the new $4,000,000 bottling facility just put "on-stream" by John Labatt Ltd. at London, Ontario.

In establishing this model plant, the brewer poured the emphasis on—

1. Up-to-the-minute equipment in the most modern layout to handle the increased volume of sales.

2. Top-dependable standards for product-quality control and cleanliness.

3. Maximum employee safety and best working conditions.

For design and development of the new main bottling section, the company carried out the program task-force style. Its own engineers collaborated with Harley, Ellington & Day of Detroit and John W. Watt & Associates of London. M. M. Dillon & Co., London, joined the team to handle the warehouse section.

The new plant consolidates under one 3-acre roof, three bottling lines and all their related operations. Indoor facilities provide for the simultaneous unloading, by conveyor systems, of empty bottles from rail cars and highway transports. Individual conveyor systems direct the empties to each of the three bottling lines and return full cartons to the warehouse shipping area, where they are palletized automatically and manually.

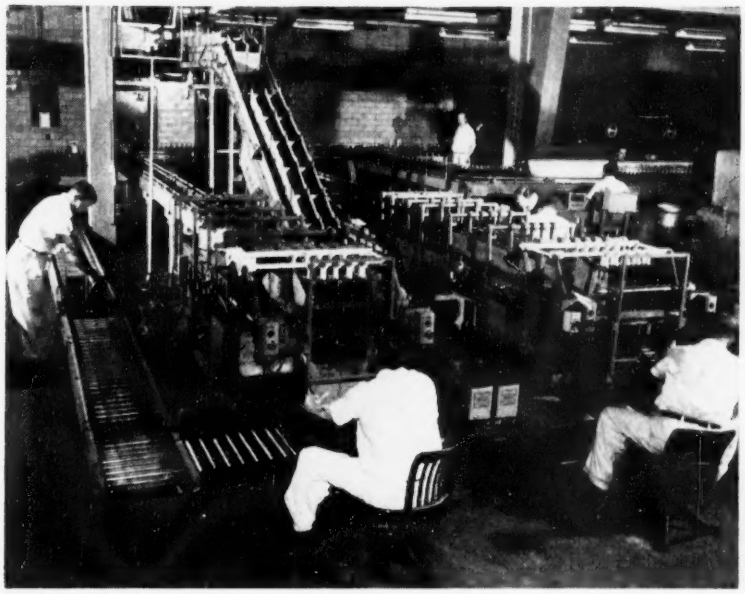
Advanced application of the latest materials handling devices marks all operations complementary to the main production cycle.

Except in the case of empty bottles (which enter the plant via conveyors at the main truck and rail docks), all incoming supplies are received on pallets at one separate station. From here they are dispersed on pallets to point-of-use storage depots adjacent to the appropriate work stations.

Construction Innovations

Believed to be unique in building design in North America is the use of reinforced concrete Vierendeel trusses to support the floor of the main bottling area above the tank room. A method was sought of spanning 38 ft. over the tank room without the use of columns—while, at the same time providing sufficient support for both a mezzanine floor and the floor carrying

Materials Move Electro-Mechanically



CASING operation is automatic, setup is compact. Empties come down center incline, are automatically filled and leave via live rollers at side.

the heavy machinery (main bottling).

To conserve critically short steel sections, reinforced concrete was employed. The Vierendeel girder, whose absence of diagonal members permits installation of heating, plumbing, process piping, and air conditioning ducts, was peculiarly suited to requirements.

A half-acre area of existing roof was raised 12 ft., by means of screw jacks, to incorporate the original building along with the two large new buildings of the plant. This roof lifting provided space for the construction of the gluer-sealer room mezzanine and the carton make-up area.

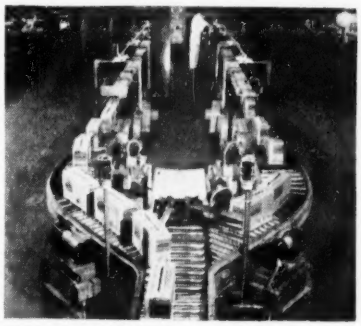
Comparatively new to Canada is the structural design of the bottling section of the plant. Employed are one-piece rigid frames supporting the roof from wall-to-wall—a clear span of 87 ft.

An interesting construction experiment is a feature of the south extremity of the main bottling area. The wall is "temporary" in that it may, when necessary, be removed for future expansion of the building without interfering with plant production. Here, three types of wall construction are being tested, for serviceability, value, and appearance, under the conditions peculiar to brewing use (such as high humidity). The three types are:

(1) "Sandwich" wall section—consisting of 2 in. of foam glass set between 2-in. inner and outer concrete panels.

(2) Wooden core section No. 1—with aluminum foil insulation on one side and corrugated asbestos wall-board on the other (outside).

(3) Wooden core section No. 2—with aluminum foil on one side and aluminum sheeting on the other (outside).



CONVERGING flow of two lines is robot-controlled. Lines are carrying filled cases from bottling room.

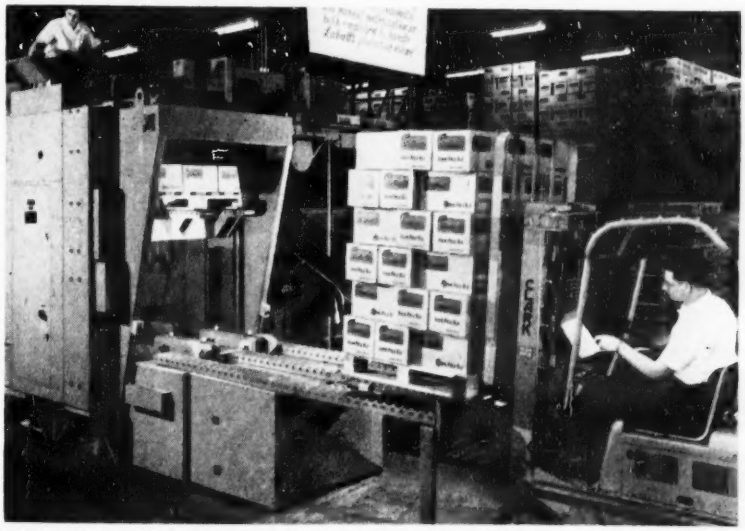
A below-ground tunnel, 200x10x10 ft., was constructed to provide passage for the conveyor lines running from the receiving area to the bottling (soakers) area. Filled-in archways in the basement construction and a concrete block curtain wall on the east side of the bottle storage area allow for anticipated expansion.

More About Buildings

There is provision for water-flooding the roof of the warehouse section for cooling by evaporation. This feature is in addition to conventional insulation. All floors are of safety non-skid type. An automatic air-conditioning system is designed for the summer and winter comfort of employees. For utmost cleanliness and a bright work area, internal surface of the main bottling section walls are ceramic tile to the roof.

In the main bottling area, high ceilings reduce machine noise and provide thorough roof-to-floor ventilation. To achieve a pleasant, safe work area, buff tile walls harmonize with green and cream (safety yellow) painted machinery. All moving machine parts are identified by the "safety yellow." Fluorescent lighting is used throughout the entire plant, both for general illumination and for intensified lighting in specific work areas.

For employees' eye comfort, the window arrangement in the main bottling area supplies considerable natural light. Special window glass reduces the transfer of the sun's heat and light rays. A large radiant-heated concrete apron in front of the truck docks keeps the area free of ice and snow. It also



THIS WAY ITS EASY. Cases from conveyor enter palletizer (left), which automatically stacks them in predetermined pattern. Lift truck removes them.

is used to quickly dispose of snow removed from other nearby areas.

All loading and unloading of trucks and rail cars are done indoors—out of the weather and at controlled temperatures. As many as 60 trucks a day can be accommodated. To unload empties from a car and then load it with full cartons takes 1 hr. by conveyors (40 min. for palletized loads). Daily 1¾ million bottles can be handled, with manual effort at a minimum.

Pushbutton Does It

Supplementing the conveyor systems are two electric hand trucks and six gasoline fork trucks. The latter are chiefly used for warehouse stacking and loading of palletized stock. Three truck docks are especially designed for loading and unloading palletized stock. By pushbutton, the height of a dock can be adjusted to the varying height and tilt of the vehicle being loaded or unloaded, enabling fork truck traffic inside the vehicle.

Six adjustable combination platform-conveyors raise hydraulically to provide inlets to the main conveyor system in the basement. Empties can be thus unloaded, and the platform-conveyor then lowered to enable immediate reloading of full cases by fork trucks. Average transport load is 12 to 14 pallets of 60 two-dozen cartons each, or 120 one-dozen. Loading time: 15 min.

Two of the nine docks are equipped with a conveyor boom. By pushbutton, the boom extends a power conveyor into the interior of the truck. Empties can be directed either to the empty bottle storage area or to the bottling machines. Without moving, the unloaded truck can be reloaded with full stock by reversing the direction of the boom loader belt and diverting a production line to that dock.

Moving Mile

The plant has over a mile of conveyors. Two main systems lead from the unloading area. One services the rail spurs (and can simultaneously handle empties from two truck docks as well). The other conveys loads discharged from the truck docks, four transports being able to unload at the same time. Six control points on the incoming systems permit an operator to direct cartons to any of the three storage lines or, alternately, to any of the three soaker lines.

In addition to governing the volume of empties directed to the various storage areas, the control points enable routing of bottles of different sizes and colors to their designated locations. A rail carload of 2,200 to 2,500 two-dozen cartons of mixed whites and greens can be unloaded in 1 hr.

The conveyor systems are a combination of power, gravity, and roller pallet types. The roller pallet type is used on the three lines feeding the three soaking machines, where cartons on the lines must be backed up to insure a continuous feed to the machines. The roller carrier reduces end-to-end pressure on the moving cartons and, along with a system of automatic limit switches, prevents pressure building up along the backlogged line. Risk of crushed cartons, falling and breaking bottles, is thus kept to a minimum. The flow of cartons of empties to the soakers is controlled by the soaker feed operator.

Similar to the railroad "block" system, red, green, and white signals inform the operators, feeding the empties cartons, about load conditions on the lines to the soakers. This feature is provided for the reason that the men feeding the lines are a considerable distance from the soaker area. Load conditions in four sections, or "blocks," ahead are reported to the empties feeders by the lights: Green advises that the line has filled up but is still moving; white warns that the section has completely filled up; red announces that the line is full, has automatically shut off, and therefore loading of the continuous belt conveyors leading to the roller carriers must be temporarily halted.

Carton "policemen" at junction points automatically give a "right of way" where conveyor lines merge. When a gate on one merging line is opened, a locking cam holds the other closed. Interruption in the flow of cartons on one line, plus the pressure on the gate from cartons stopped on the other line, releases the locking cam. This opens the gate for the line with the full supply, while closing the gate to the traffic on the opposing line.

There is new safety in the handling of caustic soda. The customary barrel of soda powder has been replaced by a liquid caustic soda handling system that eliminates all employee contact with the solution. Arriving in a railway tank car, the soda is pumped to a storage tank and thence to the soaking

Rail and Truck Facilities Are Indoors

EIGHT freight cars can be accommodated at one time in this indoor warehouse-shipping-receiving area.

PALLET LOADS or individual cases, incoming and/or outgoing, are speedily and easily handled on these truck docks.

Waste Handling Is Safe and Simple

DRUMS of broken glass are picked up by dolly and tipped into chutes (located on each floor) leading to crusher.

USED CARTONS are baled in these two units. Bales are removed by power hoist and go to shipping via lift truck.

machines. A month's supply can be pumped to storage in 2 hr.

Bottles are inspected and rejected for a variety of conditions prior to entering the soakers: For glass abrasions, minute chips and incipient cracks, off-color, and non-standard design (incoming shipments of empties include those from other breweries). Discarded too, are those bottles containing articles difficult to remove: Picnic spoons, bent bottle caps, clothespins (three dozen a day!), and other items that have been forced into the bottle or which may have slightly scratched or marred the inside surface. From these and other inspection stations come the bulk of the 1,400 tons a yr. of crushed glass (equivalent to 3¾ million pint bottles) that is sent back to the glass factory.

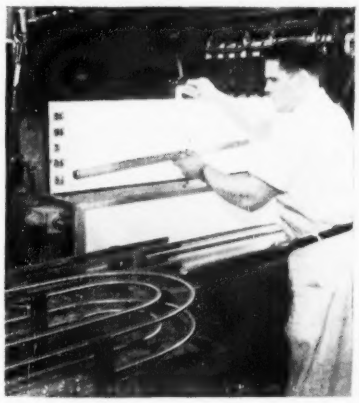
Credited for new safety and convenience for employees is a glass crushing machine that grinds the rejected and broken bottles into small pieces and directs them into a 20-ton hopper located over a truck stall. Formerly, a 225-lb. steel drum, capacity 200 lb. of broken glass, had to be lifted by hoist and dumped into the truck. Now, with inlets to crushing machine chutes located on each floor, drums of glass are simply picked up by dolly and tipped into the nearby crusher chutes.

A closed conveyor takes the glass to the crusher on the ground floor, where it is broken into small pieces. It is then conveyed by bucket elevator to a hopper two floors above. A special glass truck is positioned under the hopper chute and is loaded directly from above.

Empty used cartons are tossed onto a conveyor line that feeds them into a giant hopper above two electrically controlled waste paper balers located in another section of the building. The two balers can deliver 46 bales (1,000 lb. each) on an 8 hr. shift. They are loaded from above by a reversible conveyor. Compressed bales are removed by power hoist and transferred to the rail shipping area by fork truck.

Details on Soakers

Each of the three soaking machines discharges clean bottles through an elevating tower that delivers them directly to the corresponding rinsing unit on the floor above. On full shifts, about 1¼ million bottles can be handled by these three machines every day, assuring top production.



NEW TYPE inspection light uses fluorescent lamps in conjunction with ray-fusing glass baffle.

There are automatic devices for safety of employees and machines on the soakers, too. A safety device activates a bar and micro-switch, should a bottle jam as a result of breakage or working out of position. When this happens, the soaking machine and its rinser on the floor above are stopped automatically. Neither machine can be re-started until the soaker operator re-sets the safety switch. A red light signals the rinser operator, above, that the machine is again to be put into operation.

Efficiency of the soaking-cleaning operation has been advanced by vibrator screen attchments. These units continuously direct such residue as labels into a trap. The latter can be cleared frequently and without interrupting soaker operation. The type of soaker used subjects each bottle to eight separate cleaning actions. First and last are pure water rinses, with intervening stages varying the temperature and concentrations of caustic soda solution.

A water softening system not only improves the bottle-cleaning solution in the soakers but also greatly reduces the lime deposits, which would otherwise cut down effectiveness of the machines.

Directly below the main bottling floor, supported by the concrete trusses, is the beer tank room. The 17 glass-lined tanks have a total capacity of 200,000 gal. Controls for pumping the product from the brewhouse, a block away, and for governing the supply to the three bottling units above, are grouped on a single manifold. Besides enabling constant supervision of

the instruments, the manifold reduces the risk of injury to the operator by cutting down his need to step over hose lines necessary to the function of the tank room.

Bottling Operations

From the soakers on the floor below, empties are fed through elevating towers, directly into the rinsing machines on the main bottling floor. Here they are washed, six times under pressure, inside and out, with fresh, cool, filtered water.

Automatic and centralized lubricating systems reduce manual application of lubricants (with added safety for personnel) to the rinsers, fillers, labelers, and other equipment comprising each of the three bottling units. Filling machines are given a thorough cleansing three times a day.

Manual lifting and handling of cases containing bottle caps or crowns has been eliminated with the adoption of overhead hoppers to automatically feed the crowning machines. From an overhead balcony, where crowns are brought to the hoppers, a 2½ hr. supply can be fed to the crowning machines at one time, compared to the former ½ hr. supply that had to be loaded by hand.

In the pasteurizers, the bottled product is gradually heated, by a series of hot water sprays, to exactly 140 deg. F. It is held at this temperature for 12 to 15 min., to end further action of the yeast. Although the bottles appear to be pushed through the pasteurizing chamber, they are really being carried through at a carefully regulated pace by the "creeping" action of the floor inside the pasteurizer.

At an approximate rate of 20,000 labels per hour per unit, the five labelers on each of the three bottling lines do their work mechanically.

Inspection Studies Underway

Interesting research to establish new product examining standards, as well as reduce employee eye strain and fatigue, is a feature of the many inspection stations in this area. Inspector's work before the filling and also prior to the labeling operations.

A new type of inspection light, the idea for which was developed by the company's engineering department, utilizes a series of fluorescent lamps in conjunction with a glass baffle. The result is high intensity and improved fusion of the light rays for better inspection with less eye fatigue.

The series of fluorescent lamps in the new device can be adjusted at will to the varying sight faculties of the operator. Another advantage: For facilitating maintenance, the entire lamp series is contained in a chassis that can be speedily replaced. Experiments are continuing with the use of combinations of red, green, and white fluorescent lamps, to increase further the effectiveness and comfort of the operators in their inspection duties.

Each inspector is shifted to another type of work every half hour. Also a system of rotation has been developed to benefit those on nine other work stations. Every half hour, those at the following work points move along to the next positions: pre-filler inspection light, opposite carton folding station, carton packer, prelabeler inspection light, pasteurizer discharge point, opposite prelabeler inspection light, opposite carton packer.

The carton packing machine is served by a subsidiary conveyor system from the carton make-up machine located in another area of the building, receiving its supply by Ezy-Doz (one dozen) and Ezy-Deuce (two dozen) cartons set up, with bottoms sealed. Filled cartons are carried by conveyor from the packing machines directly to the carton sealing room, where they are closed and sealed automatically as they pass along the lines that carry them over to the warehouse area or to the rail or truck docks.

Warehouse Palletized

The conveyor lines from the carton sealing area offer the flexibility of directing the flow of filled cartons either to rail, truck, or palletizing station. The warehouse is completely palletized. However, if required one conveyor line, from the carton gluer-sealer room can be directed to the rail car area and another line to the truck docks, for immediate loading.

The automatic palletizer is a rarity in Canada. In one side of this machine are stacked pallets. Into the other are directed the full cartons from the production line (gluer-sealer). At the press of a button, the palletizer takes over and stacks, on pallets, layers of cartons in a binding arangement of alternating patterns. The patterns to accommodate one and two-dozen pint cartons as well as one-dozen quart, are set on the control panel by the operator. Fork trucks remove the loaded pallets for stacking.

The warehouse - receiving - shipping area is served (in addition to the nine truck docks) by two indoor rail spurs as well as by the rail line that passes through to service the brewing building one block south. Eight freight cars can be accommodated at one time. In one day, 15 can be loaded, 10 unloaded—representing a handling capacity of 19 million bottles per month.

There are several effective safety precautions for employees governing the control of the power for the electrified rail spurs. When the drawbridge across the rail line in the warehouse is down, the power automatically is cut off and no rail traffic is possible. Further, the main switch, which must be unlocked to charge the power lines serving the plant, is fitted with a double lock. Railway personnel can unlock one. But when Labatt maintenance mechanics are assigned to work in proximity to power lines or tracks, their foreman turns a special lock that shuts off the power. And only this foreman can unlock the system.

One feature of this area is the emergency lighting which, in the event of a power break, automatically turns on a set of self-charging battery lights. Another is the electric carton-counting panel that indicates the number of cartons arriving from production by conveyor at the truck docks.

Overall Plant Data

There are 400 electric motors in the new buildings. Throughout the entire London plant there are 1,023. One man is continuously employed to care for them.

Employees in each major work area are provided with rest facilities, individual lockers with keys, and a washroom including showers. Total employees in all divisions at London vary seasonally from 875 to 1,150.

In addition to daily cleaning operations and maintenance, every Saturday a special plant-wide clean-up of 4 to 6 hr. takes place. Soaker solution and pasteurizer water are disposed of, the equipment scrubbed, and fresh solutions introduced. Filling machines are stripped and cleaned; all areas are hosed down; conveyor systems are inspected and cleaned out; and all equipment receives a special checking.

Supplied free to employees are: Rubber boots, rubber aprons, pants, and safety glasses, as required. Twice a day, all employees are served free coffee or milk as refreshments while on duty.

From the management aspect, the tax picture in connection with Labatt's facility is revealing. The company now pays twice as much taxes to London, Ontario, as it did three years ago, chiefly as a result of the new building program.

Almost $10 million a year are now regularly paid out for municipal taxes, water, hydro, wages, and purchases.

The company is also a big contributor to provincial and federal governments, paying about $15 million annually in income, malt, excise, sales, gallonage, and other taxes.

Labatt states that, in toto, this amounts to almost $60,000 in taxes every working day of the year.

POWER MOVERS ON DISPLAY

Units that save labor—up safety, too—are highlighted at annual M-H show in Philadelphia

WHAT'S NEW for keeping materials "on the move" in all phases of operations was strikingly revealed in the recent Materials Handling Exposition at Philadelphia. Through the camera's eye, this and the following two pages take you directly to the booths showing movers of particular interest to food processors.

Numerous new models of industrial trucks, conveyors, hoists, advanced attachments and devices for expediting special jobs were on display. Among carriers attracting widespread attention was a new rubber conveyor belt capable of lifting packaged goods up inclines as steep as 45 deg.

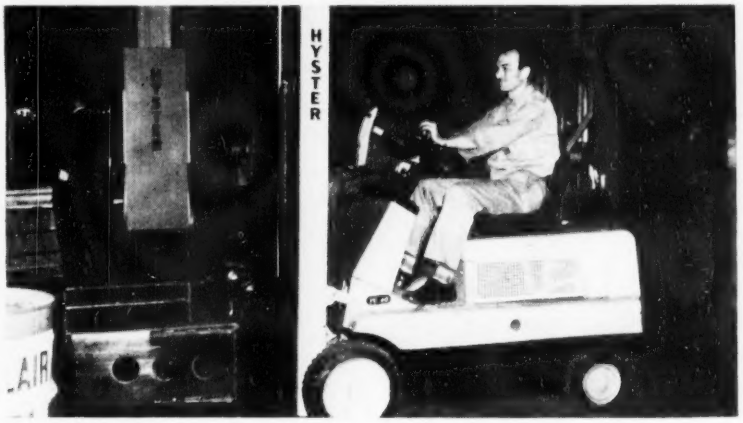
Two interesting industrial-survey figures—each showing a 1-in-3 ratio—were also disclosed at this meeting: On operating costs, recent data show that 30 to 35 percent of production-expense dollars are dissipated in materials handling. And on employee safety it was brought out that injuries from unsafe handling accounted for no less than 31 percent of the 1952 industrial total.

Leaders emphasized that with American food processing now at an all-time high, and an expanding population to feed in the immediate future, a greater amount of new materials-handling equipment must be used to efficiently move, store, and package this output in all its various weights, shapes, and sizes. And it was further pointed out that an investment in this modern equipment will improve odds on costs and safety.

FORK TRUCK OF FUTURE—the X-70—is exploratory development presented for customer reaction to innovations. Hydratork drive was feature in other working models of Clark Equipment Co., Battle Creek, Mich. (79A)

WAREHOUSER rider-type unit can be operated in 6-ft. aisles. The Yale & Towne Mfg. Co., Philadelphia. (79B)

PORTABLE elevator equipped with remote control unit was offered by Big Joe Mfg. Co., Chicago. (79C)



COMPACT, 4,000-lb. capacity, streamlined YC-40 truck, designed to speed and simplify box car and truck loading-and-unloading operations, was in action at booth of Hyster Co., of Portland, Ore. (79D)

Want more information about any items in this picture article? Just circle key number (in parentheses at end of each caption) on the Reader Service coupon on page 157.

Turn Page for More New Units→

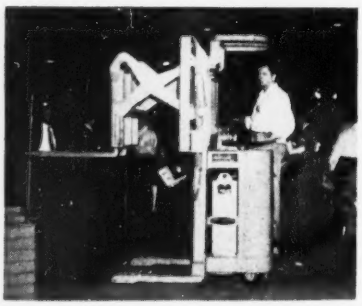
GREATER elevation is provided by new, 3-to-1 ratio hoist on Yak 430. The Mercury Mfg. Co., Chicago. (80A)

GAS-O-MATIC, having electric motor power system, was shown by The Baker-Raulang Co., Cleveland. (80B)

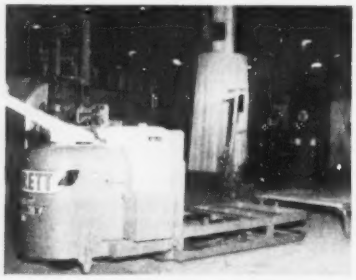
NO LIVE LOAD on driving wheel is feature of M truck of Lewis-Shepard Products, Watertown, Mass. (80C)

PAYLOADER, 6-cyl. gas unit, has drawbar pull of 6,000 lb. The Frank G. Hough Co., Libertyville, Ill. (80D)

PICKUP type load-carrying box on Solo Model was presented by Cushman Motor Works, Inc., Lincoln, Neb. (80E)

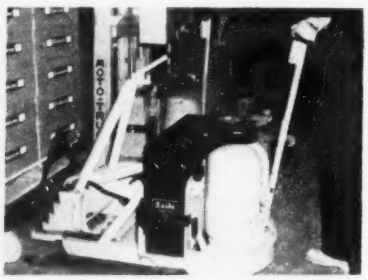


REACH-FORK for close-quarter warehouse operation was demonstrated by Raymond Corp., Greene, N. Y. (80F)

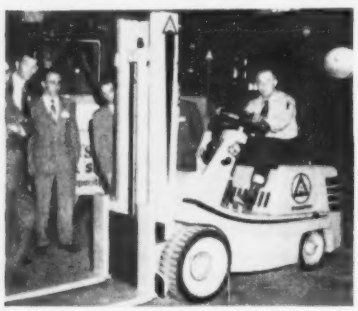


HINGED unit on Powerox permits fast, easy shift to/from skid to pallet. Barrett-Cravens Co., Chicago. (80G)

CARGO SCOUT, a fast easy-to-operate side rider, was offered by The Elwell-Parker Electric Co., Cleveland. (80H)



TRAILERS of various heights are no problem for Bulldog grip-all unit of The Moto-Truc Co., Cleveland. (80I)

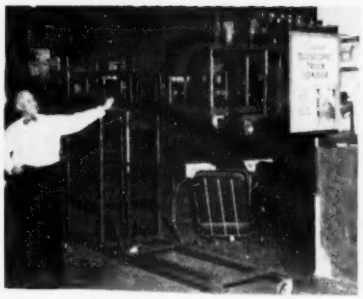


DYNAMOTIVE unit, a gas-elec. transmission truck, offered by Automatic Transportation Co., Chicago. (80J)

PNEUMATIC-TIRE lift truck, Model FPB20-24, was shown with scoop by The Buda Co., Harvey, Ill. (80K)

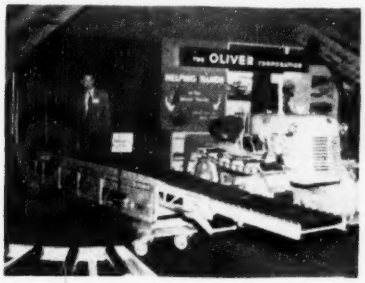
HYDRAULICALLY controlled power is offered by new Towmotorque drive. Towmotor Corp., Cleveland. (80L)

GRIPTOP belting, on Rapistan unit, carries packages up 45-deg. inclines. B. F. Goodrich Co., Akron, Ohio. (81A)

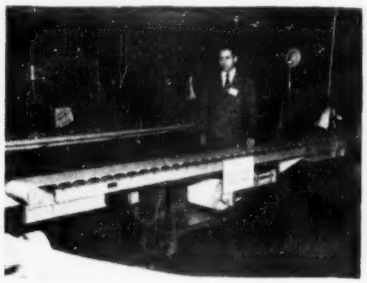


TELESCOPIC loader permits truck to be backed under conveying unit. The Wilkie Co., Philadelphia. (81B)

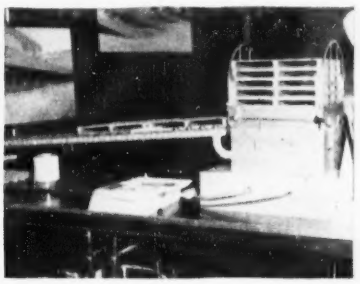
PNEUBIN panels, pulsating sections for moving drys, were exhibited by Gerotor May Corp., Baltimore. (81C)



EXPAND-O-VEYOR, a portable unit, can be extended to full length of 25 ft. A. B. Farquhar Co., York, Pa. (81D)

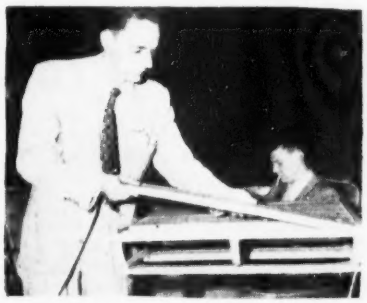


PACKAGED DRIVE unit readily converts gravity to live roller. Harry J. Ferguson Co., Jenkinstown, Pa. (81E)

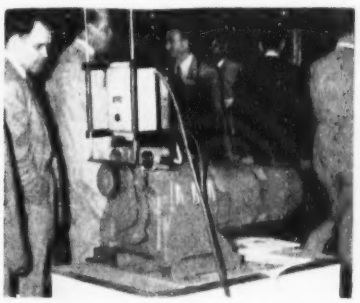


PALLETS are automatically dispensed and stacked by unit revealed by Beacon Machinery, Inc., St. Louis. (81F)

FAST selections can be made with gravity conveyor racks of The Rapids-Standard Co., Inc., Grand Rapids. (81G)

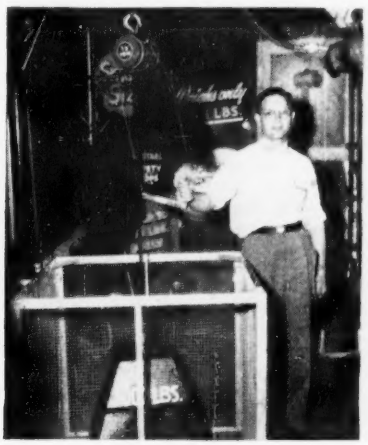


NEW TYPE steel and wood pallets, are assembled without fasteners, by Econoweld Corp., Dayton. (81H)

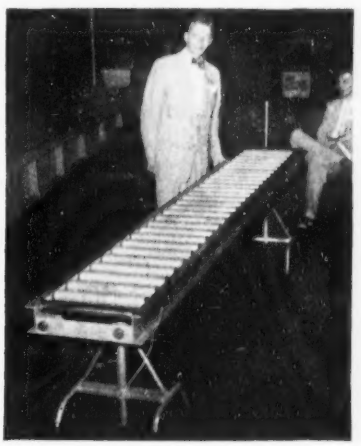


CONTROLLED reciprocating motion was demonstrated by unit of Westinghouse Electric Corp., Pittsburgh. (81I)

PEDALS geared to main driving shaft provide traction for Hydruped. R. H. Corbett, Inc., New York City. (81J)

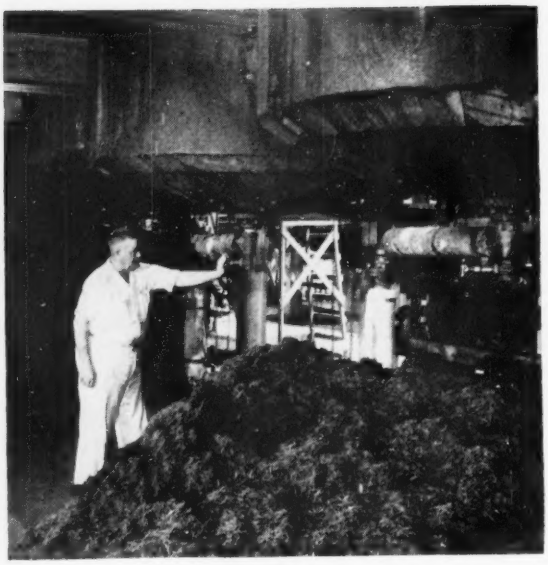


LIGHTWEIGHT (28½ lb.) air hoist lifts 1,000 lb. loads at 40 fpm. The Aro Equipment Corp., Bryan, Ohio. (81K)



PORTABLE gravity roller sections 10 ft. long weigh only 60 lb. Magnesium Co. of America, E. Chicago, Ind. (81L)

Handy syrup form of ever-popular "lickrish" provides newest spark, being more easily introduced into candies, and also finding favor in such products as cookies, meat sauces, and even cereals . . . And the use of extracts as flavoring and foaming agent in various soft drinks, beer, and ale is also noted



Extracted

Licorice extract is prepared in pressure digesters (top). Pile of spent roots will go into various byproducts.

VERSATILE LICORICE

Its Food Uses Mount . . . Processing Detailed

FE STAFF

More and more applications are being found today for that versatile, long-established food ingredient, licorice—with the latest stimulation to its employment being the development of an easy-to-mix licorice syrup that is simply introduced into confections.

Thus, there are now no less than four major working forms of the refined extracts of the licorice root, *Glycyrrhizin glabra*—the other three being the paste, the powder, and the U.S.P. extract of glycyrrhiza.

Operations are notably exemplified in the top-rung plant of MacAndrews & Forbes Co., at Camden, N. J. Here, all four forms are standardized for specific purposes, starting with proper selection of root stock and going on through refining procedures that are chemically and physically controlled.

First a word about the root: It is characterized by the presence of the glycyrrhizin—a flavoring agent which has about 50 times the sweetness of cans sugar. Mediterranean root varieties contain less of it and have a better flavor than the Asiatic types. It is because of such differences that the roots are carefully segregated and blended prior to specific product processing.

Licorice has come into various uses in the food industry as a flavoring, sweetening, foaming, and moisture-retaining agent. Surprising to many people, licorice-flavored candies need not be black. Actually, pure licorice extract is brownish-black. And when mixed with sugar and other light-colored ingredients, the candy takes on a mocha color.

With the development of the easy-mix licorice syrup, a movement was underway to promote new, improved forms of licorice confections. This trend is gradually gaining momentum, but this country will have to go far to catch up with the Europeans—particularly the British—in the use of licorice-flavored confections.

Biggest use of the easy-mix syrup and also the paste is in the making of such confections as chewing gum, starch gums, gelatin jellies, toffees, bon bons, cream centers, caramels, shoe strings, Turkish delights, pulled candies, various nut brittles and chips, and cigar and cigarette-form novelties. In addition, Pontefract cakes—a licorice confection—are sold in large quantities throughout Britain.

The amount of licorice syrup required varies with individual tastes and the type of confection. Generally, 2 lb. of syrup per 100 lb. of sugar in marshmallows and 6 lb. of syrup per 100 lb. of sugar in hard candies provide a suitable flavor.

Methods of adding the syrup flavor vary slightly with the different types of candies. In general, it is put into a batch that has been cooked 3 to 5 deg. above the normal temperatures. In this way, it is no longer necessary to recook the batch. And scorching or caramelizing of the licorice is avoided.

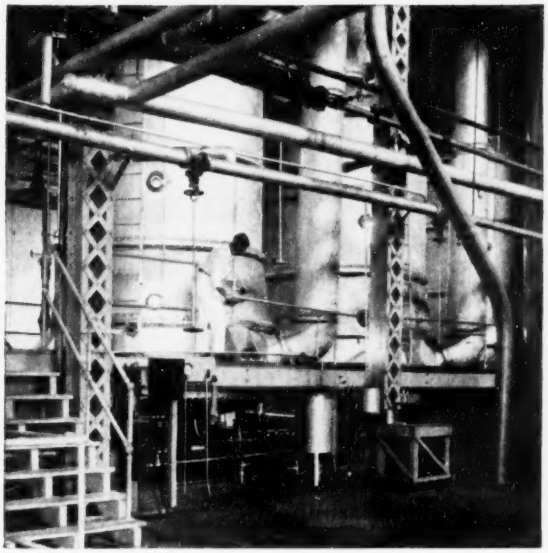
In flavoring gelatin marshmallows, the licorice syrup may be added after the batch has been cooked. Or the syrup may be warmed and introduced directly into the beater.

Licorice has also been satisfactorily blended with such flavors as peppermint, currant, blackberry, cherry, raspberry, apricot, maple, vanilla, and molasses.

Licorice extracts are employed as flavoring and foaming agents in birch beer, root beer, sarsaparilla, ale, porter, and bock beer.

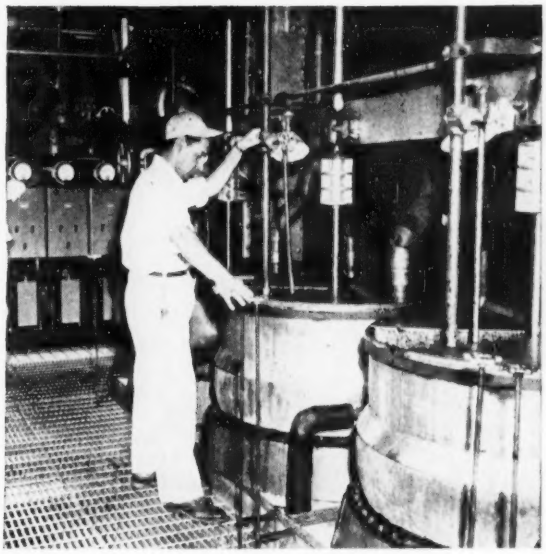
Processing Highlights

Preparation of licorice extracts for use in various food products is a five-fold operation involving shredding, extracting, clarifying, concentrat-



Concentrated

In this triple-effect evaporator, clarified licorice extract is concentrated under controlled conditions.



And Paste Formed

Liquor is made into licorice syrup in these finishing kettles. Note mass-indicating ammeters (rear).

ing, and finishing. It is an example of the application of modern processing methods to the food industry.

Selected dry licorice roots are first received in large bales, secured by wire or strap iron, and stored according to growing areas. Bales are then transported on pallets by fork-lift trucks to the processing area. Here, the strap iron is removed and the roots are blended to obtain the desired flavor and amount of glycyrrhizin in the final product. Roots pass through a bale breaker and then a hammer mill that reduces them into coarse shreds. A flight conveyor deposits the shredded roots on a horizontal conveyor belt feeding 38 steam-jacketed extractors. Sufficient boiling water is introduced to cover the roots.

In the preparation of most forms of licorice extracts except pure extract of glycyrrhiza (U.S.P.), extractions are carried out under pressure. Pure extract of glycyrrhiza (U.S.P.) is extracted by simple percolation. Extracts are tested at regular intervals by the control laboratory.

Spent root goes into byproducts. For instance, to make a fire-extinguishing agent, the root is conveyed to another series of digestors. Caustic soda is introduced, and a second extraction takes place.

Removal of primary and secondary extracts does not complete operations. Spent root from the primary extraction is converted into insulating board. Box-board is produced from the secondary spent root.

Clarification of the primary extract is carried out in four steps. It is first fed to "blow" (holding) tanks (2,000 gal. each), where small pieces of root settle out. Next, the extract liquor is gravity-fed to a settling tank with three compartments. Here, any remaining root pieces settle out as the liquor makes three passes through the settling tank.

From here, the liquor goes through disc filter for the removal of fine suspended solids. Liquor is then pumped to a series of combination settling-holding tanks.

Paste Processing

From overhead finishing kettles, paste-form product "ropes down" into canvas lined baskets. It is then cooled and packaged

The "light" liquor is then concentrated in triple-effect vacuum pans. Here, temperatures and pressures are closely controlled to give the desired characteristics to the type of extract being processed.

Now the liquor is delivered to 2,000-gal. partially jacketed holding tanks equipped with vertical-type agitators. As a precautionary measure, concentrated liquor leaving the holding tanks then flows through another filter.

Concentrating or Drying

Depending upon the product being prepared, the concentrate goes either to rotary drum dryers or finishing kettles. Prepared in the dryers is the powdered extract, and syrup and paste in the finishing kettles.

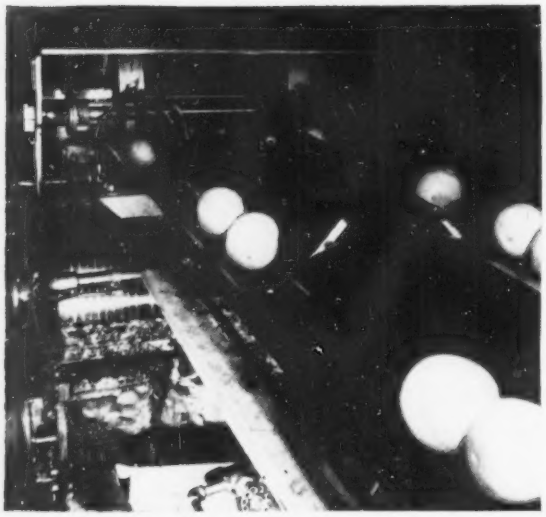
Concentrate is pumped to a trough at the bottom of each dryer. The steam-heated drum travels through the trough and picks up a thin film of concentrate. As it makes a partial revolution, the concentrate is dried, scraped off the drum by a stationary knife, and deposited into a hopper.

From here, the powder is pneumatically conveyed to another hopper that feeds a micropulverizer. Then, by means of a series of screw conveyors and bucket elevators, the powder passes through a gyratory sifter to another hopper. It is then packed into 110-lb.-capacity water-proof fiberboard drums.

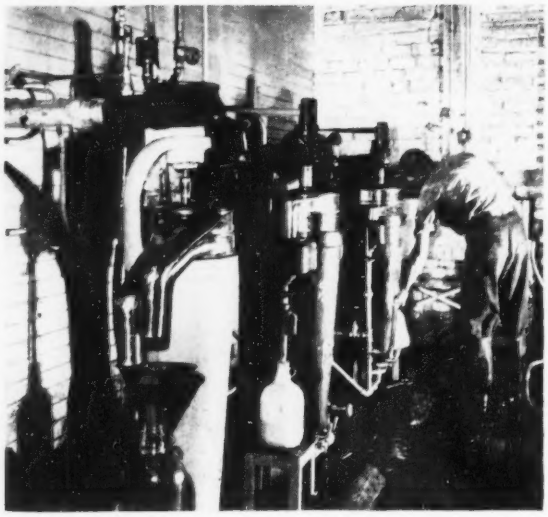
The manufacture of easy-to-mix syrup and licorice paste is completed

(Turn to page 138)

Fruit Squeezed, Oil Recovered



EXTRACTING JUICE. Grapefruit are halved by circular saws and juice is removed from sacs by pressure on a grid beneath spiked rear drum. Flavedo shavings drop into grinder hopper below.



RECOVERING OIL. Flavedo is mixed with water, ground and pumped to revolving reel, where oil-water emulsion is removed. Oil-water mixture goes to two centrifuges (rear). Unit (front) delivers pure oil.

Volume Higher . . . Costs Lower And Product Better

Maker of popular fruit-beverage base brought it all about by going "right down the line" with special progressive "TT-EE" working plan—teaming technology with energetic engineering

VERNE D. LITTLEFIELD
Research Director, The Squirt Co., Glendale, Ariz.

Originally, The Squirt Co., Glendale, Ariz., blended its grapefruit-beverage base from juice, grapefruit oil, and other ingredients supplied by outside manufacturers. But with increasing consumer acceptance, coupled with quality control problems, it became apparent that the product would have to be made directly under company supervision and direction.

"It is not enough to produce a high quality beverage base", says H. B. Bishop, president of Squirt. "Its condition of quality must be controlled and protected through its subsequent bottling and distribution right up to the time consumers buy it from retailers".

Thus began a new era for this grapefruit beverage. For, in progressive steps after the company began manufacturing the product, the process and product quality have been improved and refined. And today control of quality begins at the plant and ends with the retailer. The improvement in product quality had broadened markets—increased consumer demand. The greater concentration of the base and rise in production volume has brought notable savings in manufacturing costs, labor, freight, other handling costs, and in container and storage expense.

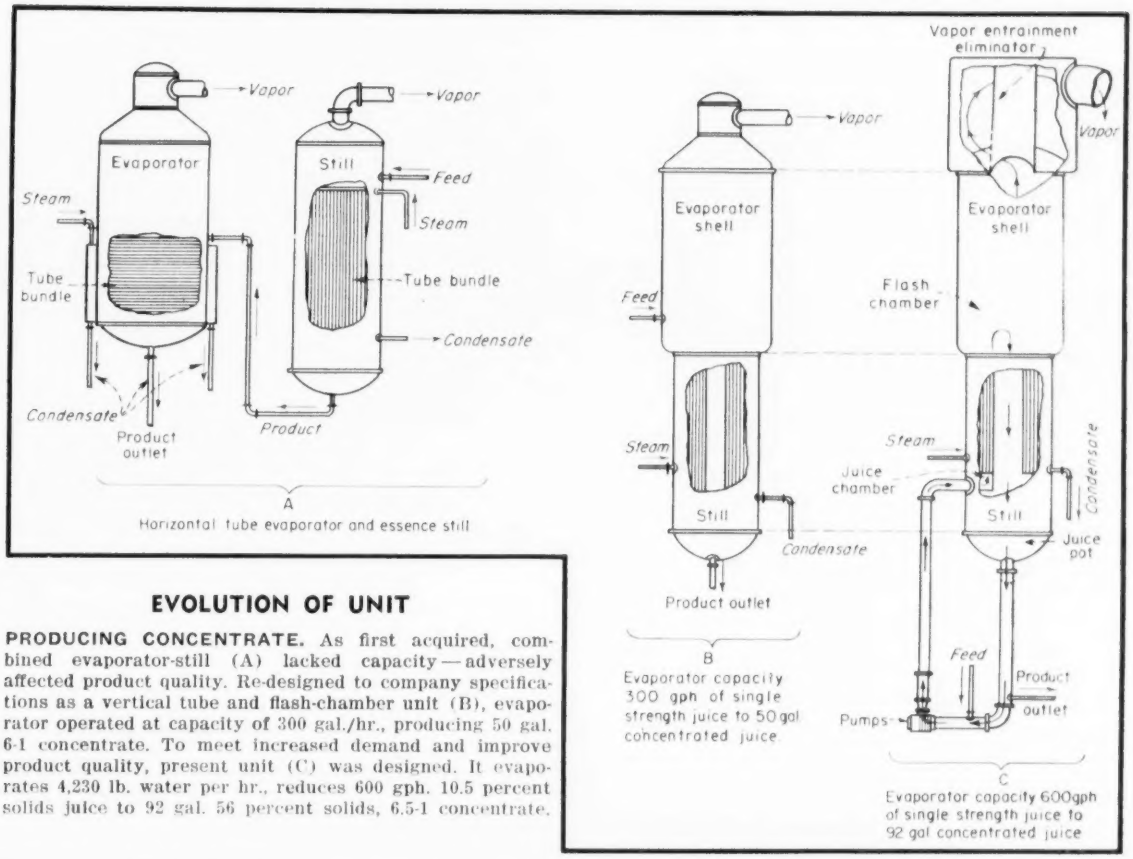
A look at the record will indicate what progress has been made in the past few years:

A gallon of beverage base made originally from juice purchased from outside sources produced only 14 cases of bottled, carbonated beverage. Currently, a gallon of the new, more highly concentrated base makes 53 cases. And quality has been enhanced by carefully controlling juice-extraction pressure and temperatures in the process.

The base is now made from concentrated, pulpy juice that contains a minimum of "peel water." High pressure used in extracting the juice adds an excessive amount of peel water containing pectinous substances from the grapefruit rind. Subsequent pasteurization of this juice starts the hydrolysis of these pectinous substances to form pectic acid and other degradation products. When made into beverage base, these partially degraded pectinous products further disintegrate, especially in the presence of added citric acid. Beverage bottled from base made from juice or concentrate containing excessive peel water would not retain the desired cloud but clarified in varying degree dependent on the amount of

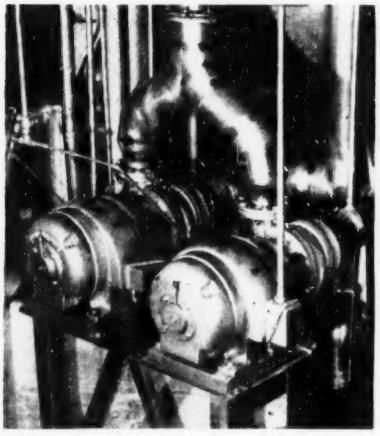
DIRECT LOOK at the advanced operations on Squirt's top-quality fruit-base line is presented in photo and diagram in this month's FE Foldout-Flowsheet. Just turn to page 118-121.

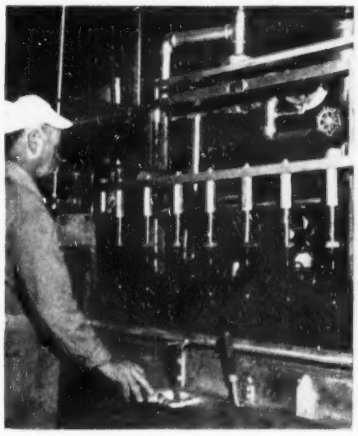
Juice Concentrated, Base Bottled



EVOLUTION OF UNIT

PRODUCING CONCENTRATE. As first acquired, combined evaporator-still (A) lacked capacity — adversely affected product quality. Re-designed to company specifications as a vertical tube and flash-chamber unit (B), evaporator operated at capacity of 300 gal./hr., producing 50 gal. 6-1 concentrate. To meet increased demand and improve product quality, present unit (C) was designed. It evaporates 4,230 lb. water per hr., reduces 600 gph. 10.5 percent solids juice to 92 gal. 56 percent solids, 6.5-1 concentrate.





POSITIVE circulation of viscous juice in evaporator is provided by two pumps (left). Concentrate is filled into polyethylene-lined steel drums, stored at 36 F. until needed. Then it is pumped from drums (center) to stainless blending tanks. Beverage base is vacuum filled into oxidation-retarding colored gallon bottles (right).

degraded pectinous products present.

The pectic acid and other degradation products would not hydrate to from colloidal suspensions. Instead they would combine with hardness minerals, calcium and magnesium, in water, to form insoluble pectates.

Several limitations were imposed upon production volume, not the least of which were bottlenecks in the processing line. By engineering new equipment and devising different techniques, the line first was stepped up to 4 tons of fruit an hour. The next improvement–the current process–increased raw material capacity to 8 tons an hour.

Receiving

Grapefruit for processing is supplied by three sources. This allows considerable latitude in obtaining the necessary quantity of fruit to keep the plant continuously operating. It also permits selection of good quality fruit for juicing at the most favorable time during the season. Approximately 50 percent of the fruit is orchard-run grade. It is picked from the tree, trucked to the plant, and processed in a short time sequence.

Fruit is purchased by the ton and,

also, by minimum juice content. A mechanical sampler, in the unloading system takes fruit for check from each load. This sample is weighed and hand-burred to determine juice content. The resultant juice sample is laboratory analyzed for its sugar-acid content and for flavor and pulp. This first laboratory analysis is only the beginning of many control measures taken to insure quality and uniformity of product.

Amount of grapefruit processed into concentrate is subject to several limiting variables. Under average conditions, 15,000 gal. of juice is extracted from 192-200 tons of grapefruit every 24 hr. This results in the production of 2,100 to 2,800 gal. of concentrated juice, the amount depending on the solid content of the juice.

The grapefruit storage bins provide sufficient capacity to operate the plant during night hours when picking and hauling have stopped.

Fruit handling here does not differ materially from usual citrus handling practices. Small quantities are stored in bins to prevent excessive splitting or bruising. Washing is in three stages. First, the fruit is cleansed in a tank containing constantly changing cold water, to remove loosely adhering substances and dust. Then it is transferred to a second tank for soaking. This tank may be heated, also may contain detergents if the fruit should have tightly adhering substances on the peel. Third, the fruit goes to a transverse brush washer where, with the aid of high pressure fresh water sprays operating at 100 psi., all remaining foreign substances are removed from the peel.

Next the fruit is conveyed to a live roll table that slowly revolves fruit in front of sorters. The sorting is rigorous to remove all fruit that might affect flavor or quality of final product. Unsuitable fruit may range from the sunburned to softs or splits, with culling, too, of the very small sizes that do not have a mature flavor. Normally cullage is low because of the high quality fruit purchased.

Juice Extraction

Subsequently, the sound fruit is conveyed to a stainless steel Citro-Mat. Two circular saw-toothed revolving knives halve the fruit and these are then guided between two rotating, transverse drums with the flat cut side toward the front drum. The drums have short spikes that grip the fruit, pulling the halfs between them and exerting enough pressure to split the outer peel without actually crushing the fruit. The rear drum drags the half fruit over a grid, located underneath it, to remove juice sacs.

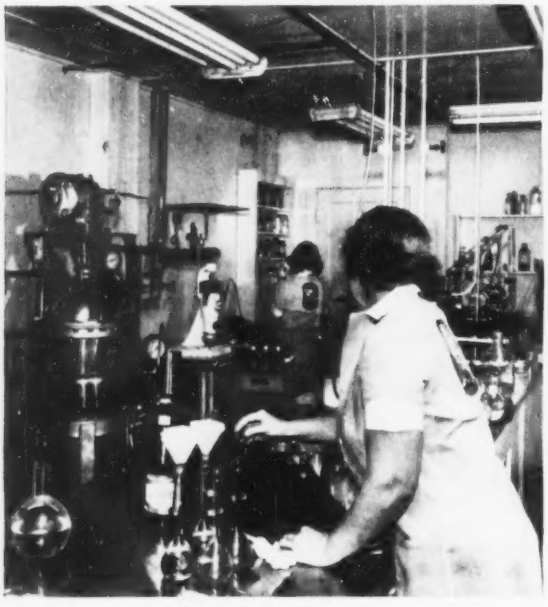
Peel is then carried by the rear drum to an attachment that shaves a thin layer of the outer yellow-colored portion (flavedo) of the rind from the albedo. Essential oil of grapefruit is concentrated in balloon shaped cells in the flavedo. The albedo is dropped into a screw conveyor and eventually is transferred to a dryer, where it is made into cattle feed.

Quality and quantity of the juice delivered by the Citro-Mat can be varied considerably by the mode of operation. The aforesaid grid is held in place by means of pistons operated by regulated air pressure. This allows it to move up and down to accommodate thicker or thinner peel as well as exert a uniform pressure during extraction. Adjustable stops determine how close the grid approaches the rear drum. These two factors—amount of pressure and proximity of grid to drum—determine quantity and quality of juice extracted.

In general, citrus canners and concentrators operate the air cylinders at a relatively high pressure and set the grid close to the rear drum. This increases liquid yield by 20 percent or more. For this present product, pressure is kept at the lowest practical point and the grid clearance is set so that no pressure will be applied to the albedo. While this means a loss in quantity, it produces a juice that enhances the quality of this beverage base.

Among aforementioned quality problems, inclusion of peel water results in darker colored concentrates (both juice and base), more rapid deterioration of the base, presence of

Uniform Product Quality



Chemical analyses

Bacteria checks

EXCELLENCE and uniformity of beverage is assured by constant checking in a completely equipped, well-staffed laboratory. Continual analyses are made of fresh fruit, pasteurized single-strength juice, and concentrated juice. Records from these analyses form the basis for blending drums of concentrate made from various lots of fruit to

bitter and peely off-flavors, more rapid development of oxidative-type off-flavors, and waxy residues contributing to formation of "oil" rings on bottles of finished beverage.

Oil Recovery

Peel and other remainders represent 60-70 percent of weight of fruit. Flavedo, shaved from the albedo, is combined with a small amount of water and ground, then pumped into a revolving reel. To wash the oil of grapefruit from the ground flavedo, water is sprayed over it in the reel. Resulting thin emulsion is pumped to two centrifuges operating as separators. These break down the emulsion, yielding a heavy creamy liquid. This heavy emulsion is transferred to a third centrifuge that separates an oil of better than 99.9 percent purity. After oil recovery, the flavedo is combined with the albedo and dried for cattle feed. The effluent from the centrifuges is waste.

Clear oil, representing about 0.5-0.10 percent by weight of the fruit, is stored in 5-gal. glass jugs for about 3 months at temperatures below 0 F. This low temperature treatment removes any traces of water as well as certain non-volatile substances. These precipitate in the form of a waxy sludge or as light colored yellow amorphous pellets (stearoptenes). The sludge is removed by filtration during part of the storage period. It is the substance partially responsible for development of whitish oil rings on bottles of beverage as well as some off-flavors in the finished product.

Extracted juice which, hereafter, is handled only in stainless steel equipment, flows by gravity to a screw-finisher. This separates the juice from waste seeds, heavy pulp, and rag of carpellary membrances. Since it is desirable to have some cell sacs in the finished beverage, the screen used in the finisher contains 0.033-in. perforations. The unit is operated with low tension on the end of discharge plate.

Processing

Pressure is purposely held at the low point to keep from forcing rag into the juice and breaking up seeds. A higher quality juice with less naringin results, although there is a sacrifice of yield. To remove entrained air, the finished juice flows continuously through a float valve to a baffle deaerator that consists of plates and umbrellas over which the juice passes in thin films.

After deaeration, juice is collected in a 500-gal. holding tank. Vacuum is maintained on the deaerator and holding tank with a single-stage steam jet exhauster. Normally, these storage tanks are used only as a reservoir (150 gal.) for the pasteurizers.

Juice is pumped through water-jacketed tubular heat exchangers for flash pasteurization.

Concentration

Hot, pasteurized juice is fed into the single effect, forced circulation, continuously operating evaporator. This vacuum unit operates at an absolute pressure of approximately 1 in. mercury. Two-stage steam jet exhausters with inter-condensers maintain the vacuum. These exhausters are capable of lowering the absolute pressure in the system to 0.30-0.60 in. of mercury, depending on temperature of water delivered to the barometric condenser.

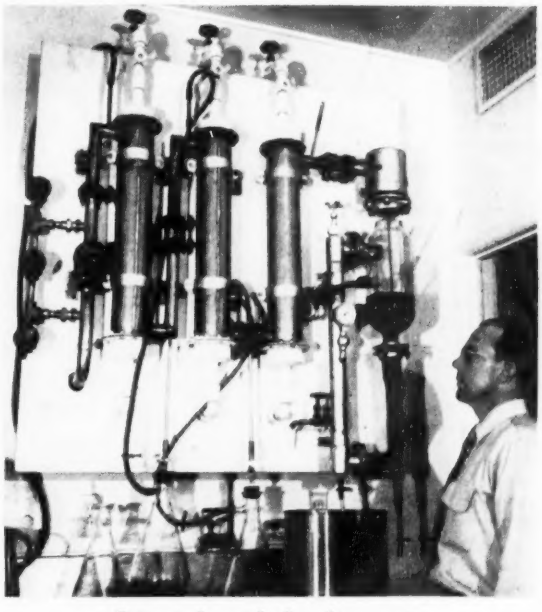
The evaporator was redesigned and rebuilt, according to company specifications, from the shell of a discarded stainless steel horizontal tube evaporator and essence still. This combined unit—(A) in accompanying drawings—was bought in '43. Since then there have been several revisions in design to increase capacity of the unit as well as to improve the quality of the concentrate.

The horizontal tube evaporator was discarded by the first owner because of burn-on of the viscous concentrate on the outside of the tubes. Almost impossible to clean, it produced a poor quality product. After study, parts from both evaporator and essence still were combined to make a vertical tube evaporator—(B) in draw-

Controlled by Laboratory

Product control

provide uniformity of beverage base. Bottlers' samples of Squirt beverage are regularly sent here for analysis to assure standard quality in the finished drink. Continuous



Research and development

research in product and process development has improved manufacturing efficiency and techniques, resulting in notable product refinements.

ings. This unit utilized natural circulation of juice, upward through the calandria section, resulting from both heat and ebulition. The juice was recirculated through the tubes by a single central downtake.

This unit was designed to concentrate 300 gal. of juice per hour to 50 gal. of concentrate. Its capacity was limited by the slowness of heat transfer through the walls of the tubes in the calandria section, largely caused by the slow circulation of the viscous concentrate. This slow circulation also caused overheating, resulting in a slight darkening of the concentrate, although no burning, scorching, or fouling of tubes was evident.

This unit operated at about 120 F. and an absolute pressure of approximately 2 in. mercury, which were usual figures in this field.

To effect operating economies that would off-set increases in manufacturing and distribution costs, it was determined that the base should be more highly concentrated. But engineering research showed that it was not feasible to produce such a product of good quality in this evaporator.

So it was evident that, in order to make a more highly concentrated base, the capacity of the unit would have to be raised and the temperatures of concentration reduced. To gain this objective, in 1951 the evaporator was again rebuilt—(C) in drawings. Formerly a natural circulation type evaporator, it was redesigned for forced circulation. Pumps were installed. A baffle was added in the bottom section of the juice chamber to provide entry of the juice into the heat exchange section. And diameter of the central downtake was increased to accommodate the additional flow from the heating tubes through the downtake to the pumps for recirculation.

With increased ebulition and turbulence in the flash chamber, it was necessary to install an entrainment eliminator on top of the unit. This prevents carry-over of juice droplets in the extremely high velocity vapors leaving the evaporator.

Increase in evaporation capacity called for raising condensing capacity, which was achieved by doubling capacity of the cooling towers.

The concentrated juice is pumped from the evaporator into cold-wall holding tanks equipped with agitators. It is held in these tanks under vacuum. Chilled brine circulated in the tank jackets reduces the concentrate temperature to approximately 60F. When a tank is full and the product thor-

(Turn to page 145)

These Key Facts Back Up Operating Efficiency

MATERIAL & ENERGY BALANCE TABLE

Unit Description	Rated Cap each Unit	Cap. All Units	Planned Line Balance	Elec. Hp. Ea. Unit	Total Elec. Hp. All Units	Steam @ 135 Psi.	Product Temp. Enter	Product Temp. Exist	Regrig-eration Tons	Water Gpm.	Water Temp.
Fruit conveyors (2)	....	....	.....	3 & 2	5	.....	....	....	....	...	.....
Fruit washer-conveyor	....	....	.....	3	3	.....	....	....	....	100	80°F
Fruit sorter	....	....	.....	2	2	.....	....	....	....	...	.....
Juice extractor (Citro-Mat, Bireley's)	8 tons/hr.	....	8 tons/hr.	5 & ½	5½	.....	....	....	....	...	.....
Peel grinder	....	....	.....	5	5	.....	....	....	....	2	.....
Ground peel pump	5 gpm.	....	5 gpm.	1	1	.....	....	....	....	...	.....
Reel and emulsion pump	5 gpm.	....	5 gpm.	2	2	.....	....	....	....	2	.....
Centrifuges (Sharples)	....	....	5 gpm.	2 & 2	4	125 lb./hr.	....	....	....	...	.....
Peel screws and elevators	10 tons/hr.	....	5½ tons/hr.	(¾ & 1½) & 5 & 3	10¼	.....	....	....	....	...	.....
Juice finisher (Food Machinery Corp.)	20 gpm.	....	10 gpm.	3	3	.....	....	....	....	...	.....
Vacuum deaerator steam jet	....	....	.....	....	....	430 lb./hr.	....	....	....	...	.....
Pasteurizer	900 gph.	....	600 gph. (10.5% solids)	....	....	670 lb./hr.	70°F.	198°F.*	....	50	230°F.
Juice pump	....	....	.....	1	1	.....	....	....	....	...	.....
Waterpump (hot, circulated)	....	....	.....	½	½	.....	....	....	....	...	.....
Vacuum evaporator	900 gph.	....	600 gph. to 92 gph. of 51% solids	....	....	3,800 lb./hr.**	198°F.	92°F.	....	700***	70°F.
Cent. circ. pumps (2) (Allis-Chalmers)	625 gpm.	1,250 gpm.		15	30	.....	....	....	....	...	.....
Steam jet exhausters (Schutte-Koerting)	....	....	.....	....	....	1,000 lb./hr.	....	....	....	25	80°F.
Cooling tower (Marley) fans (2)	....	....	.....	10	20	.....	....	....	....	...	.....
Cooling tower (Marley) circ. pumps (2)	....	....	.....	20	40	.....	....	....	....	700	83°F.
Concentrate Handlers											
Storage tanks, agitators	800 gal.	1,600 gal.	.....	1	2	.....	92°F.	60°F.	....	...	.....
Pump-out of evaporator	12 gpm.	....	92 gph.	2	2	.....	....	....	....	...	.....
Pump-out of storage tanks	12 gpm.	....	.....	½	½	.....	....	....	....	...	.....
Refrigeration compressor	....	....	.....	5	5	.....	....	....	5	50	80°F.
Conc. juice to cold storage (flow)	....	....	2,200 gpd.	....	....	.....	60°F.	36°F.	....	...	.....
Transfer pump	12 gpm.	....	.....	1	1	.....	....	....	....	...	.....
Homogenizer (Manton-Gaulin)	800 gph.	....	.....	25	25	.....	....	....	....	...	.....
Formulating tanks, agitators	800 gal.	4,000 gal.	.....	1	5	.....	50°F.	36°F.	....	...	.....
Filler and capper	500 gpm.	....	.....	1 & ½	1½	.....	....	....	....	...	.....
Service Units											
Deep well pump	.....	.....	700 gpm.	50	50	.....	....	....	....	...	80°F.
Refrigeration storage (temp.)	....	....	.....	....	....	.....	60°F.	36°F.	....	...	.....
Ammonia compressors	....	....	.....	20	40	.....	....	....	35	200	80°F.
Cold-diffuser fans	....	....	.....	2	6	.....	....	....	....	...	.....
Compressor (Freon)	....	....	.....	5	5	.....	....	....	5	20	80°F.
Cold-diffuser fan	....	....	.....	1	1	.....	....	....	....	...	.....
Steam generator (boiler hp.)	240 bhp.	....	240 bhp.	....	....	.....	....	....	....	...	.....

Controls of Vacuum Evaporator

8-Point Micromax Recorder (Leeds-Northrup)
Electromax Controller operating motor-driven steam valve (Leeds-Northrup)
Absolute pressure recorder (Taylor)

Rated Plant Capacity

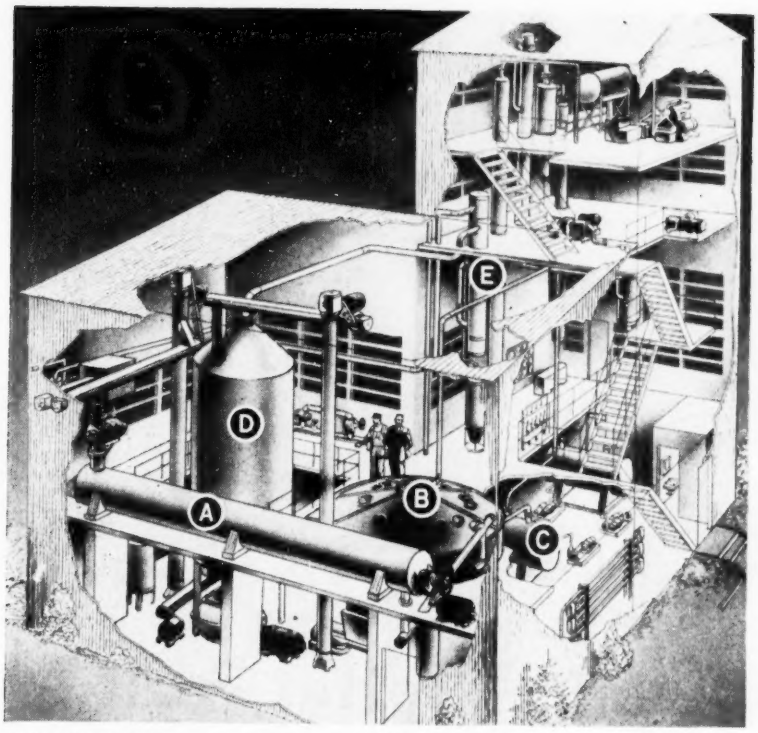
Under average conditions, 192 tons of fruit per 24-hr. operation

Footnotes

* Heat furnished to evaporator by hot pasteurized juice (198°F.) ..... 510,000 Btu./hr

** Steam 135 psi to calandria condensate at 180°F. —approx. 3,800 lb. or ..... 3,942,650 Btu./hr.

*** 700 gpm. barometric condensing water at 70°F. increasing to 83°F., adsorbing 4,452,652 Btu./hr. 4,452,650 Btu./hr.



CUTAWAY VIEW of "package plant" for continuous solvent extraction of cottonseeds. Cooked seeds are mixed with weak miscella in extractor (A), then slurry goes to horizontal filter (B). Separated miscella flows to tank (C). Cottonseed meats move from filter to desolventizer (D). Solvent is recovered in condenser (E). (Lukenweld photo)

Direct Solvent Process Aids Small Operators

Packaged plants for cottonseed feature new cooking and extraction techniques that eliminate costly pre-pressing and increase yield of oil. Applicable to other products, too

FE STAFF

Solvent extraction of cottonseeds, with its more complete recovery of oil, is now commercially feasible for plants handling less than 200 tons per day.

Reason is a new advance—a filtration-extraction process developed by Southern Regional Research Laboratory, that enables ready installation of "packaged plants" in capacities from 75 tons upward.*

What's more, the developers see application of the new process to other oil-bearing products such as soybeans, peanuts and rice brans, also, to extraction of any soluble component from a solid phase.

Maximum use is made of standardized components such as crushing rolls, pumps, fans and motors. Also, employed are delinting, dehulling, crushing and cooking equipment, and buildings previously used in screw- and hydraulic-press milling. This greatly minimizes first cost of an installation.

Space is efficiently utilized—for a 150-ton plant requires only 20x45x40 ft. in height. Labor costs are cut as much as 75 percent.

Also, the following additional benefits are seen:

1. More complete extraction of oil than is possible by pressing operations.
2. Oil of quality comparable with regular solvent extraction plants yet requiring less solvent and power.
3. Maintenance costs are less than with other processes.

Heart of the new process is a continuous, horizontal vacuum filter of standard design equipped with a gas-tight enclosure to prevent loss of solvent.

In it the strong miscella—25-35 percent oil—is separated from the cottonseed meats by displacement, with countercurrent washing that employs a minimum of solvent.

How It Operates

The filtration-extraction process uses new cooking and extraction techniques developed by SRRL. Rolled cottonseeds first go into a cooker, where they are exposed to a maximum temperature of 230 deg. F. Then after cooking, seeds are cooled by aspiration as they are conveyed to the extractor.

Here, they are mixed with solvent containing a small amount of oil (weak miscella). Approximately 98 percent of the oil in the seeds goes into solution during the controlled—15-25 min.—mixing, forming a concentrated miscella.

This step compares with 45-60 min. required for direct extraction and 30-50 min. for pre-press extraction. Also, slurrying in the new process is at 80-90 deg. F., as compared with 120 deg. in the regular extraction processes, although the latter temperature may be employed when higher yields are desired.

Resulting slurry of seeds and miscella is transferred to the above-mentioned rotary filter, where the concentrated miscella is separated and the bed of solids subjected to a series of washes. First and second washes are with weak miscella, the third with hexane.

Strong miscella from the filter is evaporated for recovery of oil. First wash goes to the extractor, and second and third washes move countercurrently until they become strong miscella.

Solvent-damp extracted meal is discharged from the filter continuously and dried by standard methods.

An additional advantage of the new cooking technique is the fact that an oil of low gossypol content is produced.

*Several engineering firms, among them Lukenweld Div. of Lukens Steel Co., Coatesville, Pa., and Blaw-Knox Co., Pittsburgh, have received licenses from USDA to build plants employing the new process. First installation (by Lukenweld) is now nearing completion for Mississippi Cottonseed Products Co., Jackson, Miss.

1 **WORKING** pushbuttons, attendant controls operation of gantry to unload fruit from ship to loading shed.

2 **THESE** four gantries carry pocket-type conveyors that are used for unloading bananas from boats.

Better Handling—Better Fruit

Remote-control crane-carried conveyors with canvas pockets quickly, yet gently, unload bananas from ships. Then special "curveyors" with padded steel cradles take fruit to car and truck loading sheds

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

Consumers are now getting higher quality, unbruised bananas through two recent advances:

1. Improved handling techniques at pier-side to minimize manual transferring.

2. Better protection of fruit from ship's hold to trucks or railroad cars.

This progress was marked up by United Fruit Co.'s engineers and researchers. Outgrowth was the world's largest mechanical banana-unloading terminal. Located in Weehawken, N. J., this facility is equipped to handle 8,000 stems of bananas an hour.

Estimated weekly unloadings from four refrigerated vessels is 250,000 stems.

Several hours are now saved in the dispatch of bananas to markets by the improved transportation facilities, which eliminate transferring of refrigerated cars on floats between New York and New Jersey shores.

Advanced Handling System

Mechanized handling now features four pocket conveyors on gantry-leg cranes and four company-designed "curveyors" (flexible conveyors with curved, padded plates attached to cables). Each gantry conveyor carries stems from a hold of a ship to a curveyor, which, in turn, delivers them along platforms to waiting railroad cars and trucks.

During unloading, three gantries and three curveyors are in operation. The other gantry and curveyor serve as a "standbys" in the event of a breakdown on one of the other three handlers.

Each gantry rides on tracks, one rail being alongside of the track shed and the other on the wharf. Controlled with pushbuttons by a man aboard ship, the gantry conveyors travel 600 ft. either way along the wharf. To facilitate unloading, two gantries can serve the second hold of the ship.

Each gantry has a free-swinging boom, which supports the pocket conveyor and lowers it into the hold of the ship.

Incorporated in each gantry conveyor are 5x6-ft. rubberized-canvas pockets attached to a chain conveyor. Stems are loaded into each pocket and conveyed from the ship's hold to the track shed. At the transfer point—from gantry conveyor to curveyor—each stem of banana operates a photoelectric unit that registers one count on a remote totalizer.

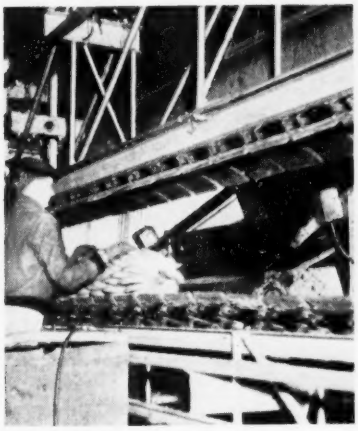
Transferring Avoided

Specially designed by UF engineer Webb Kingsbury, the curveyors eliminate multiple manual transfering of stems from one conveyor to another. Each curveyor carries stems from ship-side around curves, up and down grades, and along loading platforms. Different colors identify these conveyors—green for stems coming from ship's No. 1 hold, red for 2, black for 3, and blue for 4.

Average length of each curveyor is 1,500 ft. Each consists of curved, sponge rubber pads (1x10x18 in.), mounted on mating steel plates attached to wire cables. Pads are carried by a pair of 3-in. rubber wheels, riding on tracks. Speed of curveyors is about 3 miles per hour.

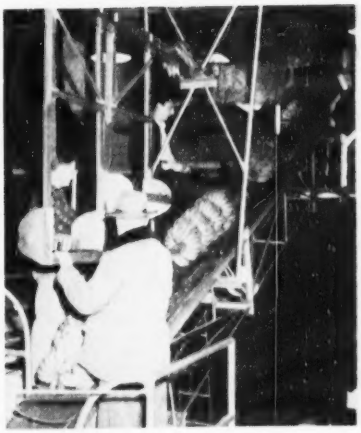
Before descending onto loading platforms, each curveyor passes an inspection station. Here, an inspector calls out the grade of each stem of bananas to two men, who alternately

Efficient Handling: From Gantry to Loading Dock

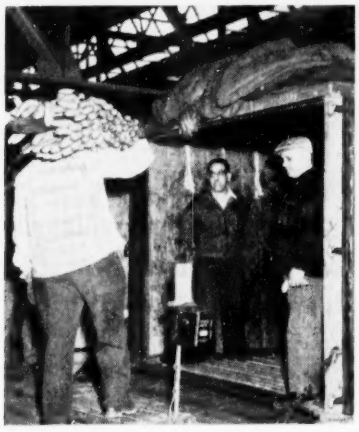


3 **STEMS** are transferred from gantry to special "curveyors."

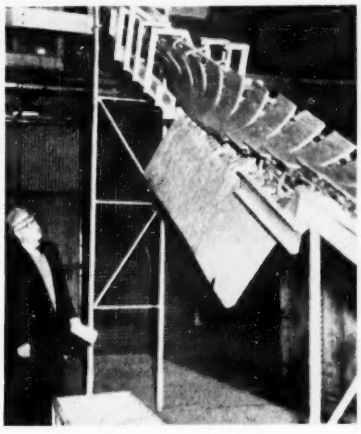
4 **FOUR** curveyors carry stems to rail cars and trailer-loading sheds.



5 **AT GRADING STATION,** bananas are inspected and tagged.



6 **LOADER** steps on foot treadle that registers count.



7 **ON RETURN** to gantry, curveyor is inverted to dump waste.

8 **DUMP-BOTTOM BIN** containing waste is trucked to dump.

place on each stem an identifying colored slip—pink for large fruit; red, small; yellow, bruised; black, partially ripe; white, eight hands; and blue, seven hands. A hand has 10 to 22 bananas—and sometimes as many as 36—running half-way across a stem.

Slowdowns or breakdowns are spotted along each line with the aid of 24 red lights. These lights flash whenever any of 24 pushbuttons is pressed to stop a line.

About 250 large stems, or 300 small ones, are manually loaded into a freight car or trailer. As each loader enters a car or trailer, he steps on a foot treadle that registers one count on a totalizer.

As empty curveyors are automatically inverted on their return to gantries, loose bananas drop into mobile Dempster Dumpsters. Three 1¾-cu. yd. dump units are automatically loaded onto a carrier to be trucked to a dump or nearby pig farms. Loose bananas are swept up in the ship's holds at the end of unloading operations and loaded into burlap bags, which are carried by gantries and curveyors to the truck-loading platform. Here, the waste bananas are dumped into 8-and 10-cu. yd. dump-bottom containers.

Incoming trailers are weighed empty and inspected for broken floor racks or breaks permitting cold-air seepage. Cold air chills the bananas, which then fail to ripen. A bill of lading, containing the tare weight and license number of each trailer, is pneumatically conveyed 600 ft. to the outgoing weighing station.

Big New Terminal

The new 1,000-ft. long, quay-type terminal runs parallel with the shore line. Built of steel and concrete on piles resting on bed-rock, the terminal is completely fire resistant.

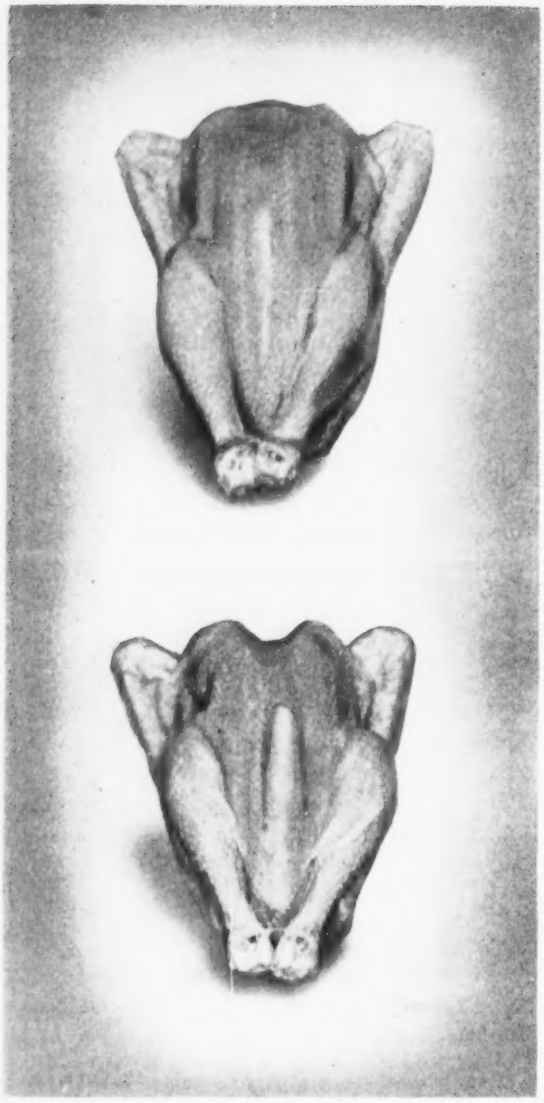
The terminal comprises a 187x440-ft. shed covering railroad tracks and loading platform and a 97x440-ft. shed for trucking area and platform. Eight railroad tracks under the roof have a simultaneous loading capacity of 72 cars. About 40 trailers can be handled on the truck platform.

Oil-fired heaters keep winter temperatures above 54 deg. F., and an overhead sprinkler system provides fire protection. Exhaust fans installed in the truck-shed roof remove carbon monoxide fumes.

Preheating System

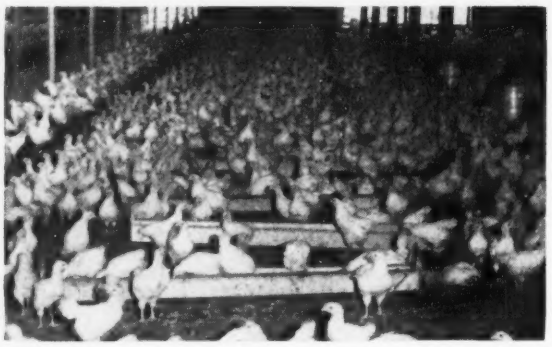
As a protection for the fruit, cars and trucks are preheated in the terminal. Also, a six-track rail storage yard has been provided adjacent to the main shed, where 144 cars can be preheated during the winter. Three tram rail tracks interspersed between car tracks, serve narrow gage cars that carry the car heaters.

In addition, 80 trucks are accommodated in 3½ acres of parking space.



BETTER BIRD with improved breast and legs is achievement with new breed (top). Compared with it here is another type chicken of the same weight.

Streamlined from egg to box →



BIG breeding houses have controlled heat, robot watering, feeding. Layers are blood-tested periodically.

Poultry:

Engineered A to Z

Quality processing of Arkansas' new "bred to the package" broiler is an extraordinarily integrated, centrally-controlled operation

DARRELL WARD
FE Correspondent, Topeka, Kan.

A unique locally developed broiler . . . rigidly supervised production by more than 200 growers . . . and a central, spanking-new processing plant distinctly oriented to the new bird. These three carefully guided endeavors neatly intermesh, down in Arkansas, as a sparkling example of advanced poultry practice.

Guiding light behind the program, which centers in the town of Decatur, is Lloyd Peterson, a local hatcher who developed the new bird and masterminds its production. Peterson sold The Seymour Packing Co.–a Topeka Kan. firm–on the idea of coming into the picture to operate a new Decatur processing plant specifically set up to dress, ice-pack, and later freeze complete local production of the broilers.

Called the Arkansas White Cornish Cross, the new breed has short meaty legs, a thick, wide breast, and reaches the 3-lb. weight quicker, and with less feed, than normal. Developed from a cross of White Cornish, Red Cornish, New Hampshire, and White Rock, it is now–after five generations–a true breed that will reproduce itself.

Besides having developed parent stock, Peterson assures its top performance by hatching all eggs and supplying to growers his own formula feed, fresh ground and mixed daily. Thus, he has general control all down the line.

Plant Features

Designed to Seymour specifications, the processing plant handles 12,500 broilers a day in less than 7,000 sq. ft. It also includes a 13,500 sq. ft. station for holding incoming birds on a special feed for a few days. The chickens are trucked-in from the producer farms.

Plant design reflects topnotch sanitation and efficiency. It includes all-stainless equipment, natural flow lines, numerous floor drains, steam jet cleaning, and fluorescent lights.

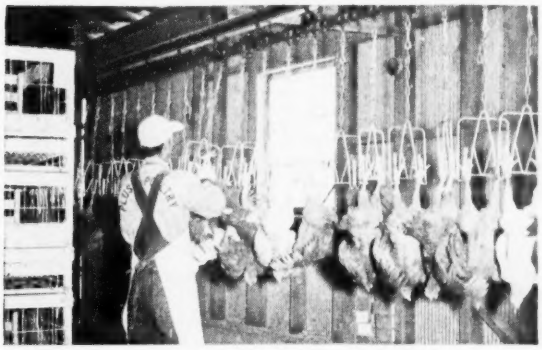
A unique feature in its waste disposal is a Gordon Johnson system that moves viscera in water through pipes to a collecting pit. Water is then automatically centrifuged off and the dry viscera packed in barrels.

Fuel Problem Solved

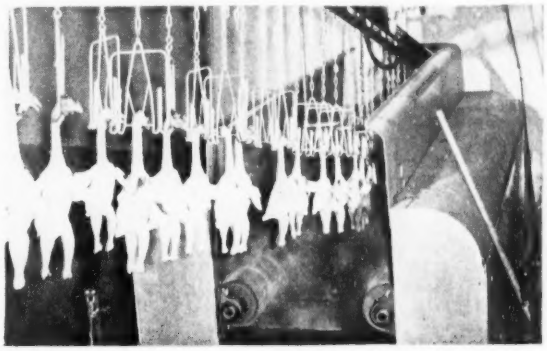
In planning the plant, which began operations in February, troubles arose over need for proper fuel supply and service. This was overcome by the resourceful Mr. Peterson, who set up his own company with tanks in Decatur to handle butane and propane gas. This relieved the problem of chick losses due to undependable fuel supply.

HATCHED in Jamesway units (rear), chicks are vaccinated against disease, trucked in boxes to growers.

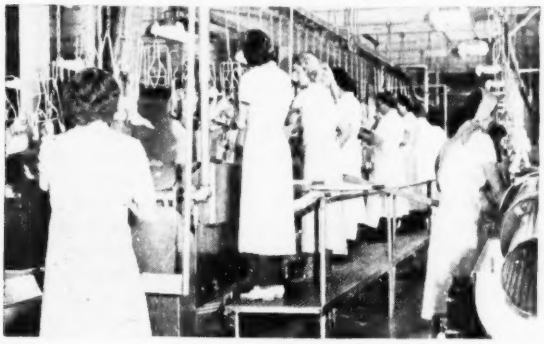
ARRIVING at plant, grown birds are weighed then go in mobile pens (left) for day or two in feeding area.



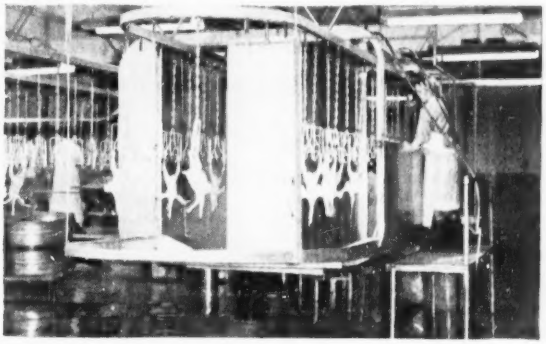
HUNG on conveyor, birds start toward kill room, where technique is special paralyzing neck incision.



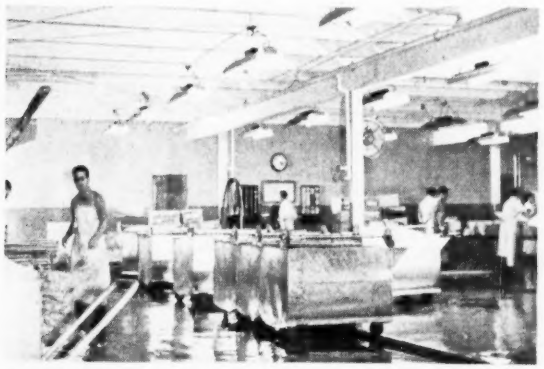
SUSPENDED birds move out of machine pickers that strip main feathers. Any remaining are pulled by hand.



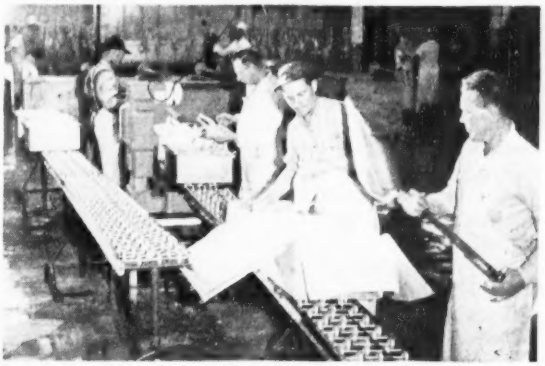
CLEAN chickens pass through eviscerating line. Giblets are washed (right) and then bagged.



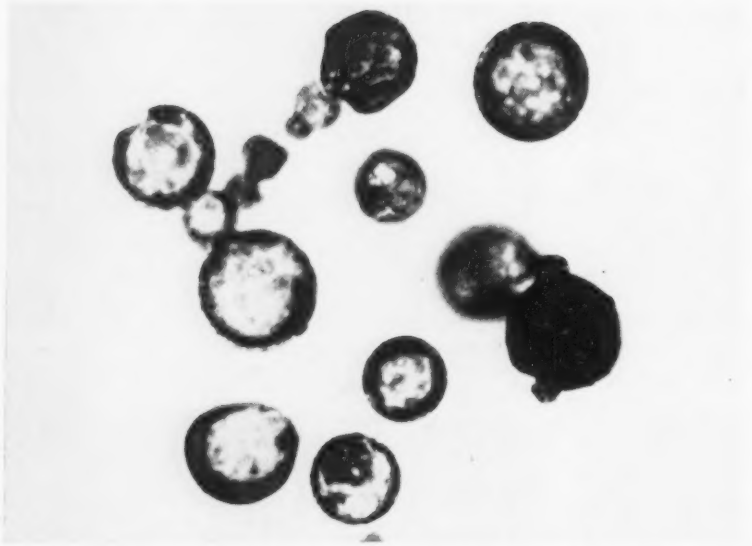
TRACK next loops into this washer unit, where eviscerated chickens are cleaned inside and out.



PACKING in ice in mobile tanks removes body heat of birds. Cranked screens lift out chilled chickens.



BIRDS are then swiftly packed in lined, wire-bound boxes. Crushed ice is shoveled in around them.



MICROSCOPE reveals how smooth, unbroken shells of natural gum effectively surround droplets of flavor oil. (Magnification, 400X)

New Coating Process *Traps Full Flavor*

It insures increased flavor retention in pre-mixes, beverage powders, packaged desserts, confections

GEORGES WELLNER
Alva Flavor Division, van Ameringen-Haebler, Inc., Elizabeth, N. J.

Most recent development in the crusade for finer flavors for packaged goods is the so-called "Sealva" process for hermetically sealing volatile products against the deteriorating effect of time and atmosphere.

From results obtained thus far with this new method in full-scale commercial usage, it would appear to represent an important step in the continuing search for improved flavor. Products made by new process have already shown interesting possibilities in the fields of packaged desserts, prepared mixes, and confections, as well as in proprietary medicines.

Basically, the process consists of forming the liquid flavor into minute droplets, which are in turn coated with a controlled thickness of natural gum.

The gum is impervious to ravages of oxidation and evaporation as long as the product is maintained in a relatively anhydrous state; yet it is instantly dissolved in water.

Presence of acid seems to somewhat shorten the effective sealing period of some of the citrus flavors. However, there appears to be no appreciable breakdown before six months of aging, as indicated by organoleptic examination.

Long Standing Problem

From the first day prepared and packaged foods appeared on shelves of the grocery store, maintenance and retention of flavor quality has been a constant problem. For flavoring materials, either natural fruit concentrates or artificial compounds, when mixed in a food base, lose their light esters and aldehydes by volatilization, leaving only the heavier, less volatile, constituents to lend palatability to the final product—half flavored at best.

Citrus flavors are plagued with the tendency to go terpeney. Once this change occurs, the fresh fruity flavor is ruined by a strong unpleasant turpentine or caraway-like note.

Many attempts have been made to seal-in or protect flavoring materials from the ravages of these natural phenomena. Among the more successful procedures were:

1. Encapsulating the flavor concentrate in a thermoplastic shell. The compound is completely protected against oxidation, and flavor is maintained in its pristine form until the capsule is dissolved.

This method is unmatched in retaining freshness of flavor. However, it presents these two serious problems:

(a) Due to improper fracturing of the capsule or inadequate mixing, flavor may be concentrated locally and not evenly dispersed throughout the mixture. This results in overflavoring one part and underflavoring another.

(b) When capsules are inserted automatically as packages of a food move through a filling line, there is always a possibility that one package may be missed or receive a double portion. In spite of careful inspection, packages may end up on kitchen tables with a double load of capsules or none at all. In either case, it's irretrievable loss of a customer.

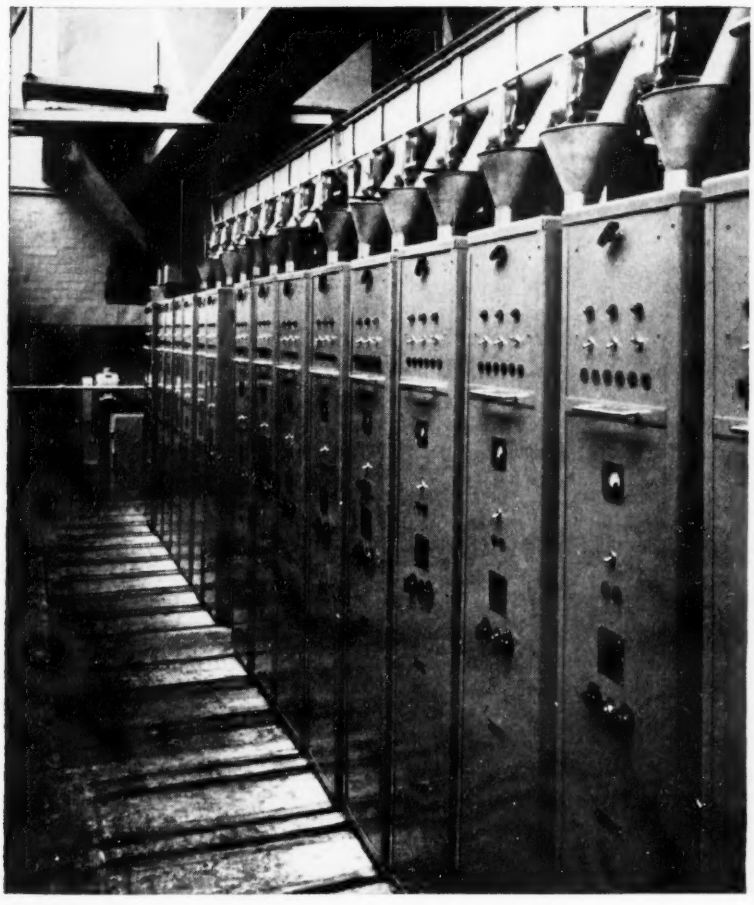
2. Emulsification of flavor concentrate, in a gelatin stiffener, which is then hardened, extruded, and formed into particles. By this method flavor is entrapped and maintained with good success. Its even distribution is assured by batch mixing before packaging. However, the problem of solubility of the particles in some products has not yet been overcome.

3. Coating the flavoring material with polyvinyl alcohol. Insolubility in the end-product rules this method out of many production lines.

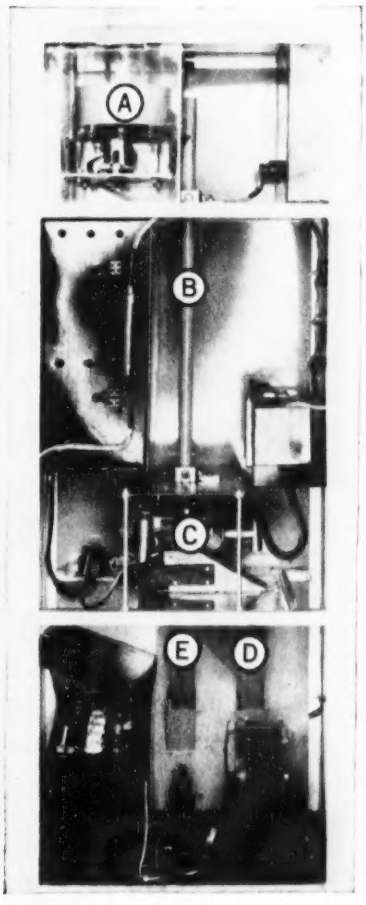
(Turn to page 136)

RECOMMENDED Uses of Sealed-In Flavors

Sealva Flavor	Weight Per 100 Lb. Summer Drink Powder Oz.	Sherbet Mix (5 oz. Pint) Oz.	Pudding Powder Oz.	Gelatin Dessert Powder Oz.	Cake Mix Powder Oz.	Pressed Candy Percent
Lemon 5X	16	3	4-5	3-4	.....	1-2
Lemon, terpeneless	7.25	1.25	2-3	2-3	2-2.5	½-1
Orange 5X	16	3	4-5	3-4	.....	1-2
Orange, terpeneless	8	1.25	2-3	2-3	2-2.5	½-1
Lime, distilled	20	1.6	...	3	.....	1-2
Imitation strawberry	25.5	1.3	2-3	2-3	.....	1-2
Imitation raspberry	25.5	1.3	2-3	2-3	.....	1-2
Peppermint	.....	....	...	...	.....	2-3
Imitation cherry	30	1.6	...	2-3	.....	1-2



BATTERY of electronic sorters used for almonds. Nuts feed from screw conveyor into top of each unit. After sorting they discharge to divided belt conveyor in rear. Note tracks on which machines may, when necessary, be moved out of line for servicing.



HOW selector works. Nuts enter vibrator (A), feed down tube (B) to scanning unit (C). Rejects leave by chute (D); acceptable products by (E).

ELECTRONIC SEPARATION

Cuts Labor, Boosts Quality

Manual inspection is eliminated and color is more uniform when small-size dry food products are sorted by new high-speed units

E. GROSZ
Creighton & Partners Ltd., London, England

Mechanical sorting of dried vegetables, grains, and nuts—with automatic separation of the defective and off-colored from acceptable ones—brings marked savings in labor and improved uniformity of products.

These benefits are exemplified at John F. Renshaw Co., Ltd., London, England, large processor of almonds.

Prior to 1951, approximately 200 workers were employed by this company to remove defective nuts before the products were processed. Even so, it was difficult, due to worker fatigue, to maintain an even standard of selection during an entire day.

▶Now, however, the company does the sorting job mechanically, and with only four semi-skilled operators. Used are four batteries of electronic color sorters—three of 50 machines each for primary separations, one of 20 machines that re-sorts the rejects from the other three batteries.

Each of the primary batteries has a capacity of 7 tons of almonds per 8-hr. shift. Performance of the sorters is approximately 99 percent. The re-sorting battery reclaims an additional 10-15 percent of the rejects.

In this installation, machines in each battery are set 2 in. apart in a

(*Turn to page 167*)

THREE of these tandem-axle tractors and tandem-axle trailers are used by Dugdale to make 1,800-mile deliveries to customers on the West Coast. Body of refrigerated trailer is of stainless steel, inside and out.

Trucks Fresh Meats Nationally

And Endorses "Own Fleet" Way

St. Joseph, Mo., packer cites service of its time-clipping fleet of reefer tractor-trailers as no more costly than rail or common and contract carriers, while affording much better tie-ins with strict plant-production schedules

IT TAKES "plenty of doing" to meet the tough schedules required in carrying out a national distribution of fresh carcasses of beef—putting the products immediately "on the road" after processing them through the plant, and getting them to distant customers on promised delivery dates.

Dugdale Packing Co., of St. Joseph, Mo., knows from experience what that "doing" involves. And it concludes that, for assurance of efficiency in such an endeavor, there is nothing quite like operating one's own refrigerated fleet.

This company delivers 50 percent of its entire output by its own motorized fleet, leaving 25 percent of less urgent shipments to rail, 20 percent to contract-carrier truckers, and 5 percent to common-carrier truck lines.

From St. Joseph, the beef is carried by the company's own equipment 500 miles north to Minneapolis; 1,500 and 900 miles south, respectively, to Miami, and Houston; 1,200 miles east to New York City; and 1,800 miles west to Los Angeles. All such loads go direct to dealers handling the popular "K.C." steaks purveyed by Dugdale.

To avoid impairment of quality enroute, temperature of the beef is maintained within 30 to 35 deg. F. Dugdale takes special pains to keep all refrigeration equipment in top condition.

Distribution over the wide sales territory is handled by a fleet consisting of 25 power units, plus 15 trailers, 13 with refrigerated bodies. The power units are made up of 15 tractors; 3 heavy trucks with tandem rear axles, and 7 lighter trucks with single rear axles. All of the truck bodies are refrigerated.

The largest units in the Dugdale fleet are the three tandem-axle tractors and three tandem-axle trailers for making runs to the West Coast, where the allowable gross vehicle weights are larger than in the eastern states. In California, maximum gross allowable tractor-trailer weight is 78,000 lb. In some eastern and midwestern states, the comparable gross allowable weight is only 59,000 lb.

The West Coast-route tractors are equipped with separate driver sleeping compartments mounted directly behind the cabs. These provide for two-driver operation without layovers on the long runs where ICC Motor Car-

(*Turn to page 168*)

TYPE unit used on shorter runs. A White Model 3000 cab-over-engine tractor with tandem-axle refrigerated trailer, it can carry an extra 3,000 lb. of payload. Still other Dugdale units carry livestock.

★What about proof of adulteration . . . value of good intentions . . . packing instructions . . . state vs. county . . . tax favoritism . . . crop contracts . . . trademark safety . . . toy-and-food mixtures . . . consumer suits?

Here, Lawyer Parker pointedly compares food processors' queries with recent high-court answers—highlighting guiding facts for staying out of trouble

9 *Tipoffs From* The Legal Scoreboard

LEO T. PARKER
Attorney-at-Law, Cincinnati, Ohio

Mr. Food Processor is vulnerable to legal difficulties like any other business man. Sometimes, in fact, more so. Thus, it's wise to keep tab of court rulings pertinent to the field. For such knowledge aids in steering wide of entanglements. Or helps ameliorate those involvements that are encountered.

Recently, the writer was traveling through several Southern and Western States and talked with a number of operators in the field. A common request was for tips on avoiding the inroads—money-wise, time-wise, and trouble-wise—that so often are part and parcel of law suits. Some of the prime questions posed, along with answers documented by actual cases, are given below. And they invite a thorough reading as well as a handy spot in the file for future reference.

Can You Get It Back?

Q—If the Government fails to prove that food it seizes and condemns is actually contaminated, can the owner recover possession of the food?

▼

A—According to a late higher court decision, the answer is no, it being held that food may thus be seized and condemned without actual proof it was adulterated or filthy. If the plant in which the food is packed is unsanitary, this alone is enough to justify such condemnation.

The illustrative case is *Berger v. United States* (200 Fed., 2d, 818). Here it was shown that following an examination of a pickle plant by an FDA inspector, three shipments were seized by the Government and analyzed. Then the Government moved against the operator, filing charges that his introduction of a number of cases of pickles and pickle relish into interstate commerce was unlawful, due to the fact that the foods were prepared and packed under unsanitary conditions and may thus have become contaminated with filth.

The operator appealed to the higher court, contending the action was indefinite and obscure. In other words, he saw no positive proof that his plant was unsanitary or that the packed pickles were contaminated. Nevertheless, the higher court approved the condemnation, saying:

"It should be noted that the statute in question is designed to prohibit introduction into interstate commerce of food which is adulterated. It is clear that the Congressional intent is to make it a criminal offense for a person to prepare, pack, or hold food under such unsanitary conditions that it may become contaminated. It is not necessary that it actually become contaminated."

Are Good Intentions a Protection?

Q—If a food packer violates a Federal law unknowingly and while having good intentions can he avoid prosecution?"

▼

A—A few months ago a higher court rendered an unusually important decision to the effect that "good intentions" will not relieve an operator from prosecution under the Federal Food, Drug & Cosmetic Act prohibiting mislabeling of goods. (*Turn page*)

Cited is *United States v. K. & S. Dog Food* (200 Fed., 2d, 370), wherein a man named Klotz was convicted in a lower court on testimony that he had sold and delivered horse meat without complying with the labeling law forbidding alteration or removal of the whole or any part of the labeling of a food after shipment in interstate commerce.

It was shown that Klotz received substantial quantities of horse meat shipped in barrels. Burlap covers of the barrels were labeled, "Jamestown Packing Company Boneless Horse Meat". When an FDA inspector visited the K. & S. plant he saw employees cutting from the meat the Federal stamps showing inspection of horse meat and placing the merchandise in other barrels bearing no indication that the contents were horse meat.

Klotz proved the meat was sold and used to make dog food and thus there were no unlawful intentions in removing the labels. But the higher court approved the lower court's conviction, declaring:

"We think elimination of the labels and permitting the repacked unlabeled barrels to go out containing horse meat were entirely sufficient to sustain the verdict. The defendant seems to insist that he acted in good faith and did not deceive the purchaser. Such a contention, of course, is beside the point, for the purpose of the statute is to prohibit commerce in misbranded articles. The good intent of the one who misbrands is of no avail."

Must It be Packed as Contracted?

Q–Is a seller or shipper of perishable food bound to pack it as requested by the buyer in a contract or letter, or can the seller pack it according to his own judgment and experience?

▼

A–A recent higher court decided that if the seller of perishable food products fails to ice or pack the shipment exactly as specified in the purchase contract made with the buyer, then the seller must assume full responsibility if the products spoil during transportation.

Testimony in the case of *Fletcher v. Ozark Packing Co.* (188 Fed., 2d, 858) showed that Ozark purchased from Fletcher three carloads of fresh spinach. Loaded on Jan. 21, the spinach arrived on Jan. 24 rotten and unfit for any use, and it was thereupon dumped by Ozark, which meantime paid the freight charges. Then Ozark wrote Fletcher about the condition of the spinach, saying it would not pay the contract price.

The purchaser alleged that the spinach had spoiled during transportation because Fletcher had failed to comply with the contract clause specifying that the cars of spinach be refrigerated by ice blown into the spaces between and above the baskets and filling the cars, but without such ice going in the baskets. On the contrary, said Ozark, the ice was only blown on top of the baskets, and so was insufficient and the cause of the loss.

The higher court agreed, holding that Ozark was not obligated to make any payment for the spinach. It said that Fletcher had failed to ice the cars as required by the contract, and such finding was "supported by substantial evidence."

Who Has the Say—State or County?

Q–Can county authorities stop operation of a plant that gets approval of state authorities?

▼

A–In a late higher court decision it was held that if the owner of a food packing plant improves or alters it to comply with demands of state authorities, a county cannot prohibit operation of the plant.

In *Ricciardi v. Los Angeles* (252 Pac., 2d, 774), it was testified that in 1922 Ricciardi erected, at a cost of about $80,000, buildings and structures especially designed and equipped as a meat processing plant.

However, in recent years many new residences were constructed near the plant, and the owners of these homes objected to its operation. The state then ordered Ricciardi to make certain alterations of his plant, and he then carried out these changes at a cost of $30,000. But soon afterward the county ordered him to cease doing business.

In the subsequent litigation, the higher court decided that Ricciardi could continue using his premises and plant, saying:

"Since the plaintiff (Ricciardi) was required by the state to improve his plant in order to remain in business, attempted limitation by the county was unauthorized and of no effect."

What of Tax Favoritism?

Q–Can a state, county, or city pass taxing laws favoring companies in certain businesses?

▼

A–A leading higher court has decided that a state has no power to limit a legitimate business or to create a monopoly in favor of one branch of food products. And therefore voided are all license fee laws that tax processors or sellers of food products more than the state expends in supervising the processors and sellers of the products.

Illustrative is the case of *Brackman v. Kruse* (199 Pac., 2d, 971) wherein a state law imposed license fees of $1,000 per year on each wholesale dealer in oleomargarine and $400 per year upon retail dealers in oleomargarine. The higher court promptly decided against the law, saying:

"The oleomargarine license fee is an exaction under the police power and therefore the exaction must be limited to such reasonable amount as is necessary to cover the cost and expense of the reasonable inspection, supervision, or regulation of the sale of such products."

For comparison, note is made of *Jelke v. Emery* (214 N.W. 373). Here, the court held that the state legislature has no more power to limit manufacture and sale of oleomargarine in aid of the dairy industry than it would have to prohibit the raising of sheep in aid of the beef-cattle industry, or to prohibit the manufacture and sale of cement for the benefit of the lumber industry.

Must Whole Crop be Taken?

Q–Our company purchased a crop of green beans but did not harvest them all. Are we liable?

▼

A–According to a recent court decision, a buyer who fails to pick the entire crop purchased from a grower is liable for full damages. And this holds true even though the contract contains a clause limiting damages collectable from the buyer.

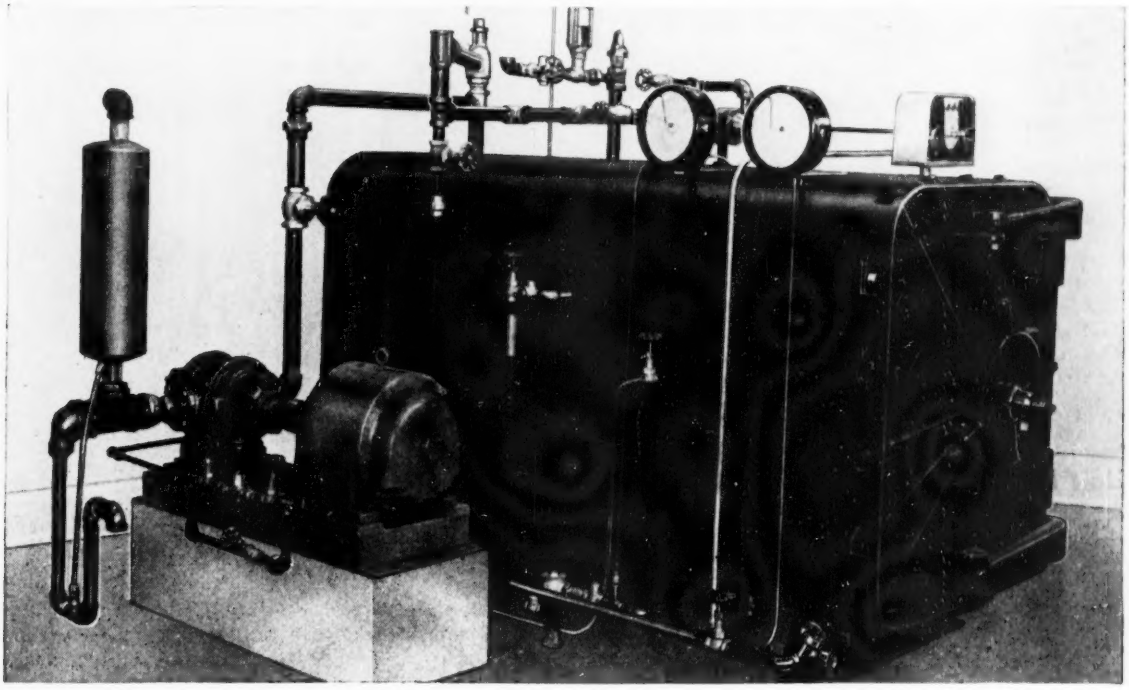
For example, in *Kuharske v. Lake County Citrus Sales, Inc.* (44 So., 2d, 641), a buyer and grower of grapefruit signed a contract containing this clause:

"The Buyer has this day advanced to the Grower the sum of $4,000 hereby acknowledged by the Grower. This sum is a guarantee fund to assure contract performance on the terms herein stated. Should Buyer fail to comply with the conditions enumerated, this contract shall become null and void. The advances made to Grower shall be retained by said Grower as liquidated damages."

The purchaser picked and paid for several thousand boxes of grapefruit at the contract price, but failed to pick and pay for the balance of the crop. Then, in subsequent litigation, he contended that the grower, even though damaged many thousand dollars, could not recover more than the

(*Turn to page 148*)

NEW EQUIPMENT & SUPPLIES



Heat, Moisture-Sensitive Foods Sterilized in New Unit

The undesirable effects of steam or hot air sterilization of heat, or moisture sensitive materials can now be avoided with use of this new combination unit.

New cold process utilizes "Carboxide" gas as sterilizing agent. To meet a wider application, maker has introduced this combination Steam-Carboxide sterilizer. A singular advantage is that sterilizer may be operated at 25 to 27 lb. gas pressure (room temperature) for gas sterilization; at 15 to 17 lb. pressure (250 to 254 deg. F) for steam sterilization; or as a combination unit employing the gas in the chamber and steam in the jacket.

Combined method of operation is advantageous in certain types of work in that it becomes practical to use shorter exposure periods because of temperature coefficient of gas and more rapid diffusion at higher temperatures.

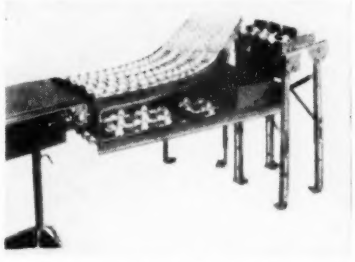
Unit illustrated is a large bulk sterilizer for use with steam and gas utilizing a vacuum pump to evacuate the chamber. Machine is equipped with Cyclomatic control, temperature and pressure recorders, and bacteria-retentive air filter.

Sizes, capacities and gas consumption for the smallest and largest of company's 13 models are as follows:

For the smaller: Inside chamber dimensions; width 24 in.; height, 24 in.; length, 36 in. Steam consumption, 55 lb. per cycle. Useful capacity 12 cu. ft. Gas consumption, 4 lb. per cycle. Larger unit: Chamber width 60 in.; height 66 in.; length, 228 in. Steam consumption, 1,000 lb. per cycle. Useful capacity, 532 cu. ft. Gas consumption, 161 lb. per cycle.—*American Sterilizer Co., Erie, Pa.*

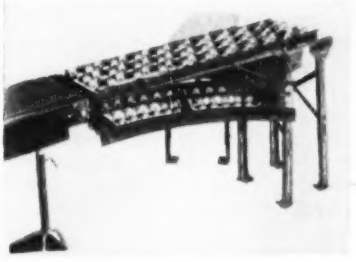
Circle 99A on Reader Service Card

Rotary Switch Serves Different Level Lines



This new type of wheel conveyor spur on Y-switch can be rotated to conect a two-way belt conveyor with either of two wheel conveyor lines set at different levels.

Called the Flip Switch, new accessory eliminates making gravity-line pitch adjustments to change direction of material flow, and permits handling of both incoming and outgoing stock on a single belt unit.



Device incorporates two gravity wheel sections mounted back to back in a rigid frame, with entire assembly pivoted at both ends. In one position switch line connects with a warehouse line to flow goods away from belt unit. Rotating assembly brings up opposite switch section that matches pitch of a warehouse line flowing goods back to belt unit. Single self-contained unit takes place of separate curved or

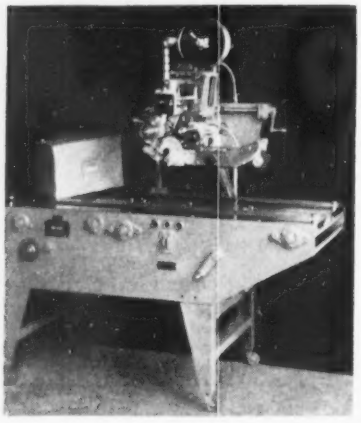
straight sections which formerly had to be detached or connected each time direction of material flow was changed.

Accessory can be had in either spur or Y-switch design for use with 18-in. width wheel conveyor. Both models are constructed so that should it ever be necessary to reverse direction of flow through switch, change can be made without sending unit back to the factory. Cases as short as 7 in. can be handled on new device.

An automatic case stop, actuated by rotating the switch, is mounted in gravity line leading to power conveyor. This stop holds goods back until switch line is in operating position.—*The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2.*

Circle 99B on Reader Service Card

Unit Labels Packages At 80 Per Min. Rate



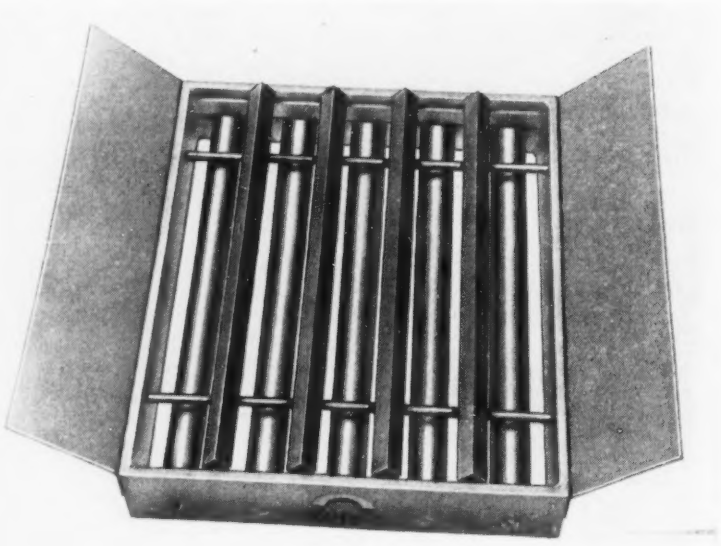
Roll-type thermoplastic labels are automatically applied to cardboard container or cellophane, glassine, wax or kraft paper overwrap at speeds of 40 to 80 packages per min. by this compact machine.

Unit accurately heat-seals a single diecut label (from roll) in any position on top side of a cardboard box, or any package having a uniform, supported surface. Packages are automatically spaced and synchronized with labeling mechanism. Positive heat and pressure are applied directly on label to assure a strong seal.

Machine handles packages 6 to 18¾ in. long, 2½ to 10 in. wide, 1⅛ to 7¼ in. high. It applies labels 1⅞ to 3 in. cut-off width, 1½ to 3½ in. long. Imprinter can be attached for variable copy on labels of uniform design. Imprint items can be quickly changed.—*Oliver Machinery Co., Grand Rapids, Mich.*

Circle 100A on Reader Service Card

Grate Magnet Cleans Free-Flowing Materials



Iron contamination is taken from many free-flowing materials with use of a permanent non-electric grate magnet, reports maker.

It is incorporated in hoppers, floor openings, vertical closed chutes and wherever space limitations prevent use of larger pieces of equipment to assure product purity, protection of machinery or elimination of fires and explosions.

Unit consists of a series of 1 in. dia. stainless steel tubes within which are Alnico V magnet castings. Tubes are spaced on 2 in. centers allowing a clear area of 1 in. between tubes at narrowest point. Rugged steel grill serves as baffle to slow down materials traveling at too high speeds and directs stream of material onto magnetic tubes.

When grate is ready to be cleaned of its tramp iron load, grill is lifted from working position. Magnetic tubes can be wiped off with cloth or blown with compressed air. Unit is easily cleaned since tubes extend full length of assembly without additional obstruction. Frequent cleaning assures maximum protection and maximum efficiency.

Frame is constructed of ¼ x 2 in. hot-rolled steel firmly welded at all corners. On inside of two sides of frame, ¼ x ⅛ in. steel grips are spot-welded to provide a ledge support for grill.

Standard dimensions of grate magnets are in increments of 2 in. on widths starting with 2½ in. and through 36½ in. Lengths start at 4 in. in increments of 4 in. through 36 in. Dimensions are changeable according to customer's individual requirements. All stainless steel construction is available when required.—*Eriez Manufacturing Co., Erie, Pa.*

Circle 100B on Reader Service Card

New Handwheel Provides Easy, Safe Operation

Ease of operation in closing valves "tight", safety, longer service life and greater overall efficiency are advantages claimed through use of new handwheel on bronze and iron valves.

Called "Non-Slip" new handwheel is made of malleable iron and features four finger-spaced lugs, continuations of spoke structure, projecting from stem hub through octagonal frame. Design permits operator to get a firm, comfortable grip on wheel and apply a high pressure, even though his hand

may be wet or greasy. Shape of wheel eliminates possibility of burned hands from contact with valve stem.

Easy grip permits tight closing, eliminating leakage, a common cause of valve erosion, wire drawing and failure.—*Lunkenheimer Co., Cincinnati* 14.

Cicle 100C on Reader Service Card

Platform Hoist Speeds Floor to Floor Moves

Materials can be easily and speedily moved from floor to floor, with this new platform hoist.

Called the Vertical Lift, it will raise and lower 800 lb. loads at standard 15 fpm. speed, or 300 lb. at 30 fpm. Platform can be lowered to within 6½ in. above floor level, and raised to a top height of 20 ft. Micro limit switches are adjustable to accurately stop platform at any point in top and bottom range of travel.

Standard steel platform size is 24 in. by 30 in., but smaller and larger models are available. Platform carriage travels on four easy-rolling V-track wheels enclosed in steel channel side frames. An automatic safety lock prevents carriage from dropping in event of cable failure. Angle iron brackets with pierced holes are provided for lagging low end of unit to floor.

Lift has electric hoist mechanism totally enclosed for safety, and is available with a variety of motor types. Entire unit is ruggedly constructed, designed for easy installation and minimum upkeep.—*The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids* 2.

Circle 101A on Reader Service Card

New Delivery Trucks Have More Room, Easy Access

Of interest to dairymen, bakers and other food processors with delivery requirements, is this new model RA-120 multi-stop delivery truck.

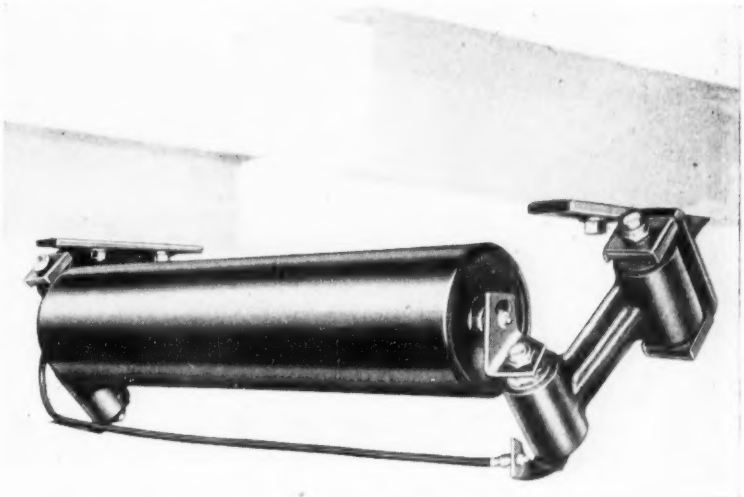
It features a 115 in. wheelbase drop-frame chassis with Metrocttc body having roomy payload space and easy accessibility. Wide sliding doors, low, curb-level step wells are highlights. Inside height has been increased to a full six ft. without any increase in truck's overall height.

Trucks, offered in a choice of four 7 ft. body styles, are available in gross vehicle weight ratings of 5,400 to 6,500 lb. New light-duty models are powered by 100 hp. valve-in-head Silver Diamond 220 engines. New in engines are self-cleaning slo-roto exhaust valves, durachrome valve seat inserts, visible-flow carburetion with fast-slide cam, ceramic-filter fuel pump.

Model is one of a R-line of trucks with 168 basic chassis models in 296 wheelbases, with GVW from 4,200 to 90,000 lb. New trucks are identified by IH emblem.—*International Harvester Co., Chicago.*

Circle 101B on Reader Service Card

Return Idler Trainer Minimizes Belt Injury



Damage to conveyor belting is minimized with use of a new type belt training return idler.

Identified as Rex Style No. 41, it provides automatic alignment for the return belt without use of side guide idlers. Most damage from roving occurs on return run where belt is closely confined between frame and supports.

Idler consists of a dead-shaft roller-

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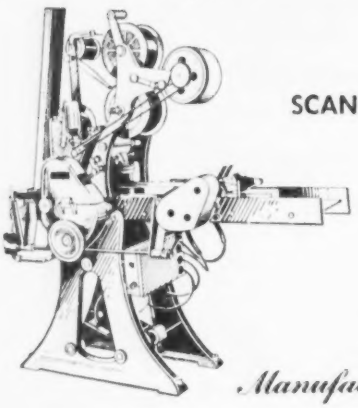
MACHINERY

BOOST SALES AND INFLUENCE BUYERS

In this era of Super-Market merchandising, makers of popular priced items such as candy, chewing gum, etc., are finding Scandia's multiple-pack automatic wrapping machines to be a tremendous SALES BOOSTER.

The Nestle Company, Inc., have successfully used Scandia high speed wrappers to present six of their famous chocolate bars wrapped as a single unit.



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bearing return roll, mounted at each end to a toggle-like arrangement of swivel arms suspended from conveyor framework at an angle of approximately 45 deg. in direction of belt travel.

Lateral movement of belt to one side results in increased weight on that side which, due to idler construction, causes that end of roll to move forward and downward. At same time, opposite end of roll is moved backward and upward and this changing of normal position of roll with belt, guides belt back to central position.

Idler acts to maintain an equilibrium, with belt in center of roll and roll in normal position. Action is equally effective on horizontal, inclined, or declined conveyors, and effect of build-up of material on roll is negligible. Because of its principle of operation, this idler operates in one direction only.

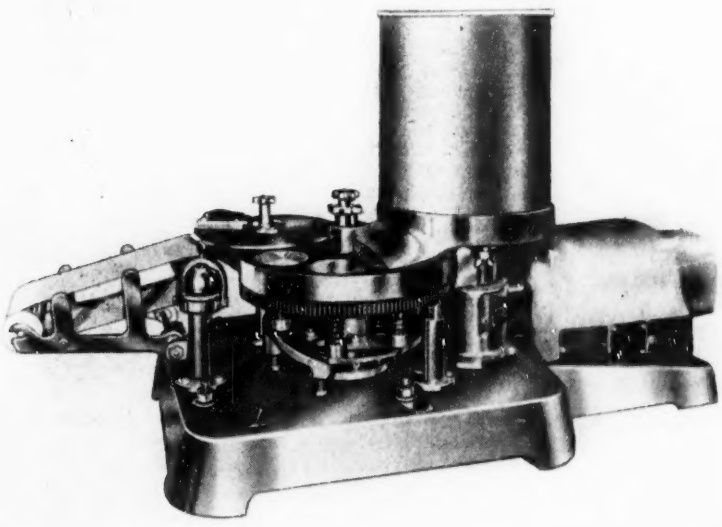
When installed, one training idler unit should be located close to head pulley to immediately center return belt and one unit close to tail pulley to center belt for subsequent loading. Additional units should be spaced as conditions warrant.

Roll shaft is regularly furnished for greasing from one side of conveyor (right side, unless otherwise specified, but which can be easily changed over to the opposite hand, if necessary) with a supported, grease-tube extension serving the far end.

Style No. 41 idler is furnished with standard 5 or 6 in. dia. steel return rolls. Style No. 41RC idler, equipped with a standard 5½ in. dia. rubber-covered spiral return roll, can be furnished.—*Chain Belt Co., Milwaukee*

Circle 101C on Reader Service Card

Automatic Pattie Machine Forms 3,600 Per Hr.



Efficient, high-speed low unit-cost production of meat patties, hamburgers, fish cakes, of exact size, weight and shape is reported with use of Model 4 AC machine. Unit has a production capacity of 3,600 patties per hr. This model is electrically operated and comes equipped with a conveyor.

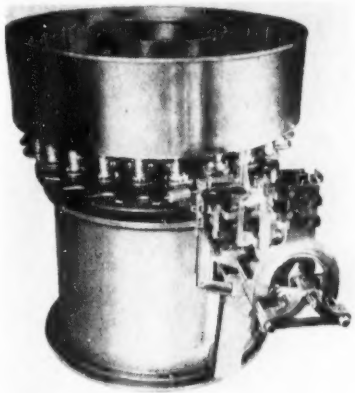
Turntable has an important thickness adjustment feature which changes thicknesses and weights within range limits of various diameter moulds available. The 3½ in. dia. mould, for example, offers a patty weight range of 2 to 6 oz. Also available are 2½ and 3 in. dia. moulds.

Machine is also used for fish cake production, with one or two crumb box assemblies installed. One box sprinkles a controlled flow of crumbs into empty moulds and coats bottoms of cakes, while second box (if specified) sprinkles tops.

Machine is run by a ½ hp. fan-cooled, totally enclosed motor. Construction throughout is of nickel-silver. Weight is approximately 350 lb.—*Automatic Food Shaping Co., Inc., 58 New St., New York 4.*

Circle 103A on Reader Service Card

Valves Move Up, Down On New Can Filler



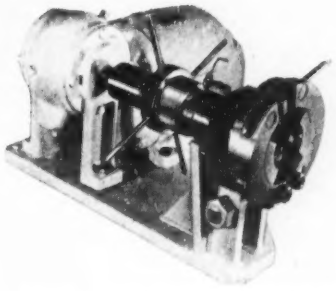
Higher filling speeds than heretofore available are claimed for this new 24-valve can filler.

In operation, cans do not raise or lower in filler, but valves move up and down. Other features include long lasting rubber seals, smooth transfer to closing machine, double wall tank that eliminates any dead juice area and a no-can, no-juice valve.

It is also stated that bent flanges or upside down cans cause no loss of juice or bent valves.—*American Machinery Corp., Orlando, Fla.*

Circle 103B on Reader Service Card

Power Driven Tool Speeds Fitting Conversion Job



This motor-driven portable tool for use within the plant, is designed for fast, easy conversion of bevel seat, sanitary fittings to close fitting, leak-tight gasket seat joints.

Converted fittings or unions use a special Hycar gasket which is smooth, non-toxic, fat-resistant, non-absorbent, and can be sanitized by steam at 250 deg. F.

Tri-Groove converted joint, as made by this tool, forms a substantially flush interior joint with gasket exposure to product at a minimum. Gaskets are

"Sure, your mixing problems are DIFFERENT

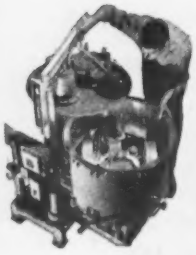
...that's why you need MIXING EQUIPMENT ENGINEERED to meet your specific requirements"

Having helped in the successful solution of hundreds of chemical process and food industry mixing problems, we *know* how different these jobs can be . . . there are hardly any two that can be handled in exactly the same way. And because these mixing, blending, reaction jobs *are* so widely diversified, you need the kind of equipment *and* experience that will give you the best solution, in the shortest time, at the lowest possible cost.

That's where *we* come in. We have the production "know-how" and we have the equipment. Simpson Mix-Mullers are the answer to any mixing problem involving dry, semi-dry or pasty materials, and are without equal when it comes to thorough mixing and blending to exacting specifications . . . thanks to the *controlled, proved Mulling Principle of Mixing!*

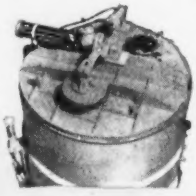
Take a good look at the typical examples of the way in which Simpson Mix-Mullers are helping scores of widely diversified chemical process and food plants to do a better, faster mixing job at lower cost. Why not submit your mixing problems to us for analysis?

...here's how we solved some typically different mixing problems



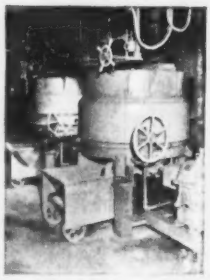
PILOT PLANT WORK ...View shows a laboratory size Simpson Mix-Muller, specially equipped for mixing under vacuum and heat, in pre-testing trial batches in pilot plant work for electrical porcelain production.

EXPLOSION-RESISTANT . . . This No. 0 Simpson Mix-Muller was specially equipped to reduce friction and heat to a minimum for the safe preparation of explosive materials. Completely jacketed for water circulation.

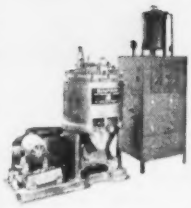


CORROSION-RESISTANT . . . This No. 2 Simpson Mix-Muller has stainless steel mixing surfaces for corrosion-resistance and improved sanitation. Unit is also jacketed for circulation of steam to aid in chocolate preparation.

ELECTRICALLY-HEATED ...Special 24-in. laboratory size Mix-Muller, with thermostatically - controlled electric heating elements. Designed to operate under vacuum or pressure in preparing experimental batches. Equipped with stainless steel pan.



WATER-COOLED . . . These special No. 2 stainless clad Simpson Mix-Mullers are equipped with jacketed sides and bottom for full water circulation, to control heat produced by chemical reaction in mixing of storage battery plate pastes.



HOT OIL CIRCULATION . . . This versatile No. 00 Mix-Muller prepares an infinitely variable number of different mixes under widely varied conditions. Equipped for vacuum and pressure, and jacketed for hot oil circulation.

USE OUR LABORATORY SERVICE We maintain a completely equipped modern testing laboratory for determining the results of mixing different materials in Simpson Mix-Mullers. A confidential test in our laboratory will prove what a Mix-Muller will or *will not* do for you. Write for further details.

We will welcome an opportunity to discuss your "different" mixing problems with you. A letter or a phone call will place our experience at your disposal.

SIMPSON MIX-MULLER® DIVISION

NATIONAL ENGINEERING CO., 622 Machinery Hall Bldg., Chicago 6, Ill.
(Not Inc.)

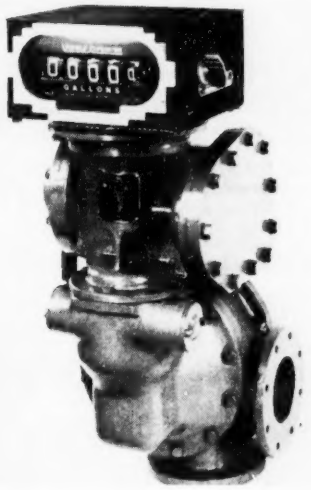
self-positioning on both male and female ferrule or fitting ends. With this tool present lines can be converted without any dimensional change and damaged fittings reclaimed.

Converted joints and fittings have thread removal at a minimum, are designed for vacuum applications and high pressure, and are strong enough to withstand normal stress and strain.

With this tool present lines can be converted to "cleaned-in-place" lines in the plant progressively and used as take down lines while the change over is in progress.—*Tri-Clover Machine Co., Kenosha, Wis.*

Circle 103C on Reader Service Card

Meter Contact Parts Are Non-Corrosive



To handle corrosive liquids, a new 2 BC Rotocycle stainless steel industrial meter has been developed.

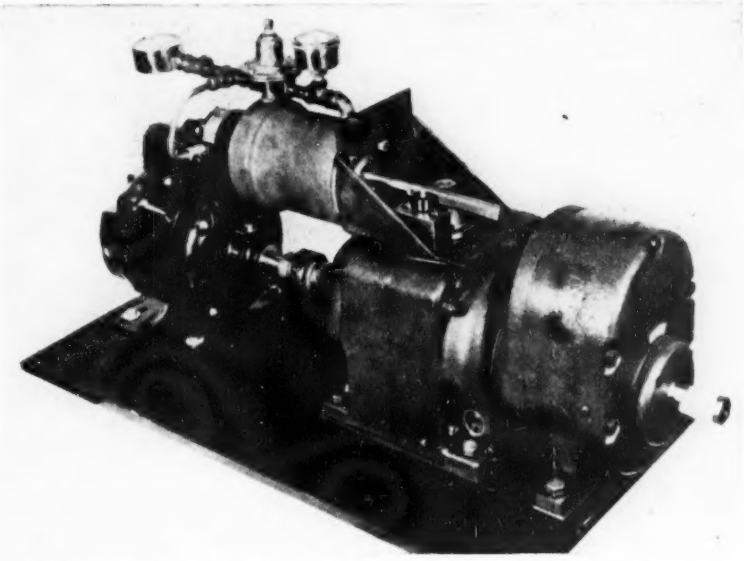
This new rotary displacement meter features a maximum capacity of 100 gpm. at a working pressure of 125 psi. All materials in contact with corrosive liquids are of stainless steel insuring satisfactory operation.

Remote registration, which provides for transferring reading of the meter register by electrical impulses to a central control room away from point where actual measurement takes place; a quantity control register with a built in electric switch that is actuated after predetermined volume of liquid has passed through the meter; swivel adapters, angle adapters and register extensions can be supplied with the meter.

Meter, weighs 120 lb. without registering accessories.—*Rockwell Manufacturing Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.*

Circle 105A on Reader Service Card

Compact Unit Provides Controlled Speeds



Predetermined speeds to fit particular processing conditions can be obtained with this compact assembly according to maker. Variable speed transmission fitted with Conoflow operator gives rapid, accurate and linear response to signals from a sensing device in system.

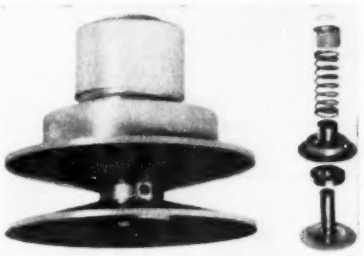
Sensing element may be controlled by flow rate, pressure, pH, temperature, and/or other variables. Regardless of function, positioner causes drive to deliver predetermined speed. Since positioner actuating arm movement is directly proportional to control pressure and output speed of drive varies directly with movement of its control lever, output speed of drive from zero to nearly maximum varies linearly with control pressure and hence directly with signal from sensing element.

Linearity of response makes unit well suited for continuous processes where operating conditions vary continuously but where rapid and close control is essential. Zero speed is had at a control pressure of 3 psi. and desired maximum speed is delivered at 15 psi.

Unit is available with or without built-in motor—of all types including explosionproof—and can be had with built-in gearboxes, both worm and helical, to give any desired top speed. Entire package including transmission, motor, reducer and Conoflow is compact and can be mounted by six bolts.—*Graham Transmissions, Inc. Menomonee Falls, Wis.*

Circle 105B on Reader Service Card

FHP. Motor Pulley Employs "A" Belt

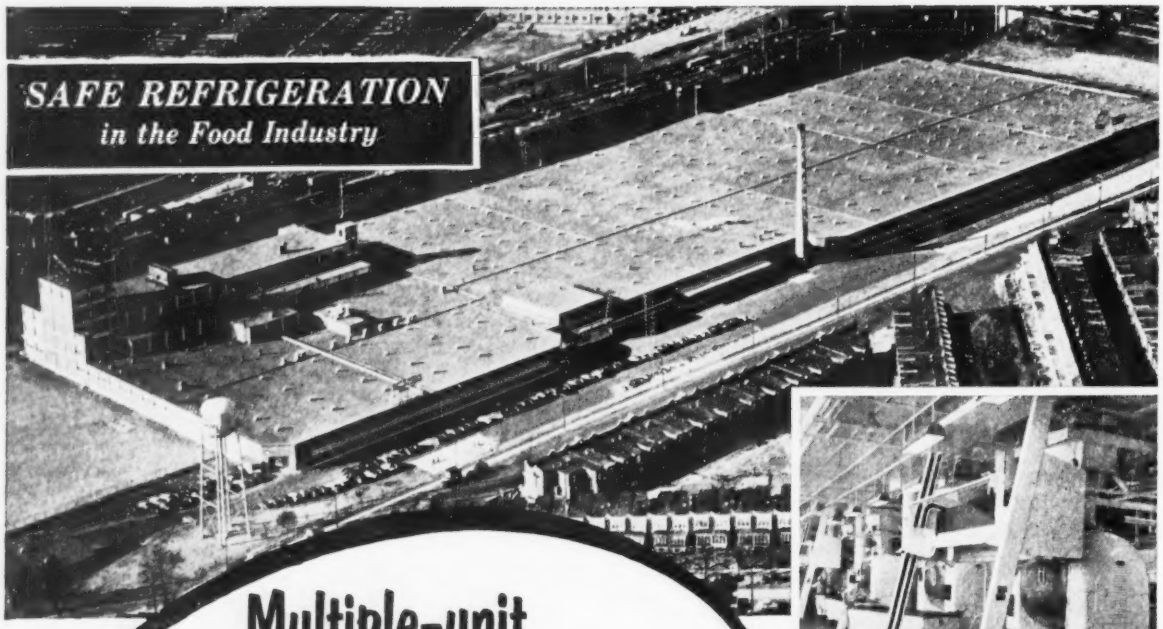


New operating principle of Var "A" Cone, a fractional hp. variable speed, motor pulley is reported to permit use of standard "A" section transmission belt.

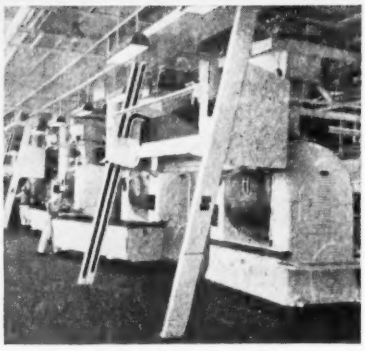
Telescopic feature of movable disk eliminates interlocking disks, and is stated to reduce belt wear, vibration, and allow infinitely variable speed changes within 2¾ to 1 ratio. Unit, termed simple to install and maintain, is applicable to equipment in the light horsepower field. Speed changes are made while equipment continues in operation.

Unit is machined of high grade cast iron. No lubrication is necessary, as bushings are of oil-impregnated type. Through shaft mounting is possible, too. Unit is rated up to ¾ hp. at 1,750 rpm.—*Gerbing Mfg. Corp., Northbrook, Ill.*

Circle 105C on Reader Service Card



Multiple-unit refrigeration system protects perishables in 17-acre bakery and warehouse



Battery of spotless machines mixes and kneads dough in ideal temperature and humidity conditions.

Supermarket chain specifies equipment charged with "Freon" refrigerants

To supply 750 retail outlets . . . and uphold their motto: "Dedicated to Better Service," the American Stores Co., Philadelphia supermarket chain, recently constructed the modern warehouse and bakery pictured above. It covers 17 acres. Here, refrigeration plays an important role. Multiple-unit installations —26 compressors of 250-ton capacity operated with "Freon" refrigerants—serve warehouse storage rooms for perishables, a 3-story bakery structure, paper-storage areas and general offices.

In the bakery . . . where 1°F. can mean costly spoilage . . . many perishable foods and raw materials are protected by refrigeration machines (principally of *York* manufacture). For example, 4 units preserve such products as frozen eggs and fruits in the 4 storage rooms; another prevents too-rapid rising of dough in the fermentation room, while single units are mounted on the chilled jackets of 8 separate dough-mixing machines; and small units cool paper for bread-wrapping machines. Combined, the separate units keep perishables fresh and pure—from dough to packaged baked goods.

Throughout the structure, several of the most modern devices have been installed to increase the efficiency of operations. Of special interest is the Minneapolis-Honeywell system which records temperatures in *16* sections of the plant every *4* minutes . . . an automatic "inspector"!

Whether you store, process, transport or sell perishable foods, Du Pont "Freon" refrigerants will help provide dependable refrigeration, and the economical performance of your equipment. These refrigerants are safe . . . nonflammable, nonexplosive, virtually nontoxic. Laboratory-controlled methods of manufacture further insure their purity and uniformity. Whenever you're in the market for new equipment, be sure to specify machines designed to use "Freon" refrigerants. Many excellent models are available to meet your requirements. E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

KINETIC

"FREON" *Safe Refrigerants*

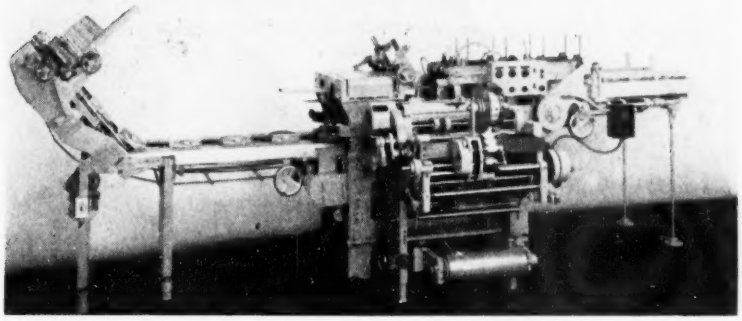
DU PONT

"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

For more information, use coupon on page 157.

Wrapper Is Quickly Adjustable for Cake Sizes



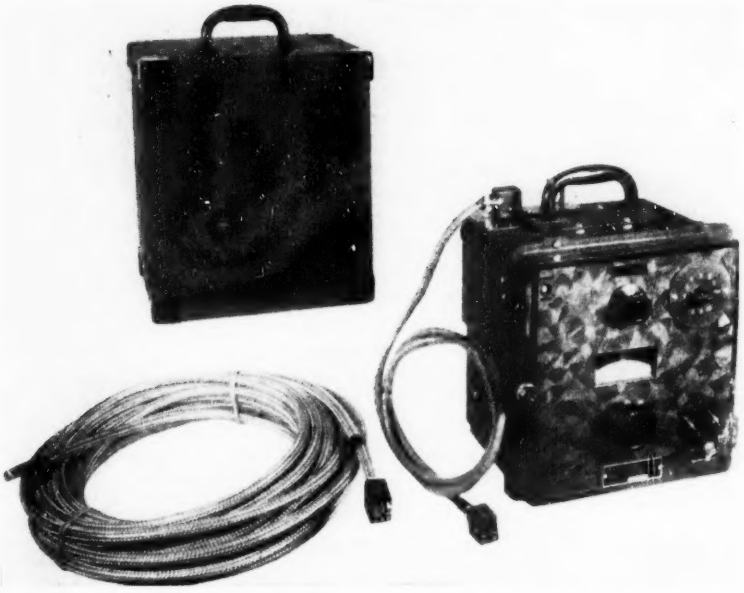
Advantages claimed for this new machine, beside labor savings of wrapping at high speeds, are said to include quick adjustability from one size to another (5-8 min.) and handling of product without disturbing the layers or marring the icing on the cake.

New unit can be adjusted to accommodate packages within the following range: Length, 4-¾ to 13 in.; width, 3-¾ to 8 in.; height, ½ to 4-½ in. Ability to handle round articles, such as angel food, layer and sponge cakes, as well as the usual rectangular shapes is said to be one of the important features.

Machine design permits addition of almost any accessory for modern merchandising—an automatic card and U-board feeder; a thermoplastic labeler; a label imprinter; and electric eye for printed papers; and underfold sealing. Machine handles usual types of self-sealing papers used for baked goods, such as cellophane, waxed glassine, waxed papers.—*Battle Creek Bread Wrapping Machine Co., Battle Creek, Mich.*

Circle 107A on Reader Service Card

Gives Quick Check on Grain Temperatures



Fast, accurate measurement of bin temperature at desired levels is claimed with use of new, portable grain-temperature indicator.

Called the Zeleny unit, it includes a 50 ft. thermocouple cable with ten reading junctions spaced 5 ft. apart. Reading instrument has a ten point switch. Turning switch shows temperature at every level of bin from top to bottom as measured by thermocouple in cable. Shorter or longer cables can be furnished. Extra cables—so you can leave one in each bin—are available.

To test, merely plug in reading instrument and turn switch through positions for temperatures. Some users prefer to install a ½ in. pipe in bin and lower cable pipe, carrying same cable from bin to bin for testing temperatures.

Reading instrument uses power from its self-contained batteries. The 10 point selector switch is furnished on all reading instruments. Complete set includes carrying case, wall hanger, extension cable, and one 10 junction thermacouple cable 50 ft. long with plug attached.—*Seedburo Equipment Co., 734 Converse Bldg., Chicago 6.*

Circle 107B on Reader Service Card

Sanitary Bakery Unit Does Multifold Job

Four distinct operations—loading, proofing, moulding and panning of finger and sandwich type rolls—are performed by a recently developed sanitary, automatic unit.

New unit enables baker to vary his proofing time from 1½ to 2½ min., regardless of number of dough balls being handled a minute. It is stated to provide perfect panning throughout proofing range, since its panning accuracy does not depend upon having all proofer tray pockets full.

Dough balls are transferred from proofer trays to a cross conveyor which delivers them in single file to specially designed distributor. This element arranges balls into rows of four in constant sequence and in position for moulding and panning.

Operation of distributor is visible through Plexiglas front.

Inlet chute which guides dough balls from proofer cross conveyor into distributor, easily shifted to divert dough balls requiring no moulding or panning.

Moulder-roll infeed chutes can be quickly adjusted so that dough balls are deposited on pan depressions. These adjustable chutes eliminate need for having a separate set of chutes for each type of pan.

Fourth dough ball to drop into each row of pan depressions automatically

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—page 157. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

FLO-SWEET ENGINEERS have the longest experience in the liquid sugar industry. From design of a liquid sugar system . . . through operating techniques . . . to finished product quality control—Flo-Sweet's unmatched experience assures satisfaction and economy.

SIX SOUND REASONS

for buying liquid sugar from the leader

1. **ENGINEERING "KNOW-HOW"** amassed over a quarter of a century goes into every Flo-Sweet installation.
2. **EQUIPMENT DESIGNS** for your particular needs are Flo-Sweet contributions to a smoothly functioning liquid sugar system.
3. **LABORATORY RESEARCH** continues to keep Flo-Sweet liquid sugars and handling techniques in the lead.
4. **PRODUCT IMPROVEMENT** has increased quality and cut costs for hundreds of Flo-Sweet users.
5. **PRECISE CONTROLS** of liquid sugar's physical and chemical characteristics are standard Flo-Sweet procedures.
6. **GUIDANCE** in use of regular or special liquid sugars is another Flo-Sweet bonus.

Remember—no other refinery has Flo-Sweet's years of liquid sugar "know-how" . . . all yours for the asking!

A QUARTER CENTURY OF LEADERSHIP

These Flo-Sweet firsts can mean substantial savings for you:

FIRST **to deliver liquid sugar on a bulk commercial basis.**

FIRST **to establish complete engineering service in design and installation of liquid sugar systems.**

FIRST **to formulate liquid sugars tailored to customer specifications.**

FIRST **to develop product quality control through use of liquid sugar.**

FIRST **to devise means of preventing surface dilution of liquid sugar in storage.**

FIRST **to develop effective means of controlling the temperature of liquid sugar going into production.**

Flo-Sweet engineers constantly strive to make Flo-Sweet liquid sugars of greater and still greater value. They will be able to help you. Why not consult them?

flo-sweet

first in liquid sugar

REFINED SYRUPS & SUGARS, INC.

YONKERS 1, N. Y.

PIONEERS IN LIQUID SUGARS FOR INDUSTRY

For more information, use coupon on page 157.

trips a trigger mechanism which moves pan into position to receive next sequence of dough balls.

Moulder element is designed to enable baker to produce finger rolls in a variety of lengths, each with ends squared.

Safety in operation is provided by having all moving parts, where injury to operator might possibly occur, fully guarded. Each portion of machine is termed easily accessible for cleaning.

Unit is shipped in three main assemblies all easily handled and quickly put together, reducing erection time to a matter of hours.—*Read Standard Corp., York, Pa. and Los Angeles 39.*

Circle 107C on Reader Service Card

Lightweight Lab. Coat Resists Acids, Alkalis

Virtual immunity to spotting and acid holes is claimed for Feon lab coat, made of a new light-weight, comfortable, and alkali-resistant Vinyon-N fabric.

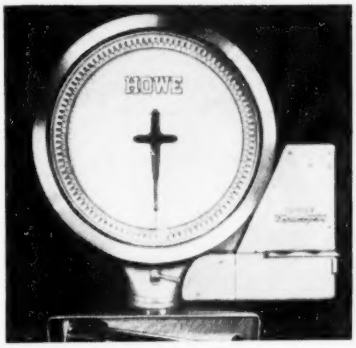
Gray in color, it will not show dirt readily, is termed cool, smooth, and not stiff or scratchy. Fabric resists strong reagents used by industrial laundries, and is also immune to bacteria and mildew. It usually needs no pressing, but can be touched up with a steam presser or medium-hot iron if desired. Pockets and thread are of the same chemical-resistant synthetic fiber, for full life protection.

Features for extra convenience include two breast pockets, two double-reinforced side pockets, pencil pocket, slots for easy access to inner pockets, and neat fly-style front.

All strain points are bar-tacked for extra strength.—*Filtration Engineers, Inc., Newark 4, N. J.*

Circle 109A on Reader Service Card

Versatile Weight Recorder Is Fast and Accurate



Simplicity and versatility mark a new mechanical weight recorder stated to be adaptable for many weight-printing requirements.

Known as Mechanoprint, it is built in as part of scale maker's Tape-drive dial head. Unit is termed fast, ruggedly designed, and has minimum of working parts to provide trouble-free operation.

Unit is located on right hand side of dial head. A simple touch of push bar causes weight to be printed. Total lapse of time from pushing of bar until recorded weight is made, is one second. Printing can also be controlled by a trip switch on a conveyor line, on a monorail system and by other methods.

It is furnished with a variety of adaptations—for standard straight ticket, ticket and tape, odd-size tickets and with identifiers, manual or electric time and date stamp.

Accuracy is guaranteed to $\frac{1}{10}$th. of 1 percent dial chart capacity.—*Howe Scale Co., Rutland, Vt.*

Circle 109B on Reader Service Card

White Conveyor Belting Resists Vegetable Oils

Exceptional resistance to vegetable oils is claimed for new conveyor belting—Supertex HC.

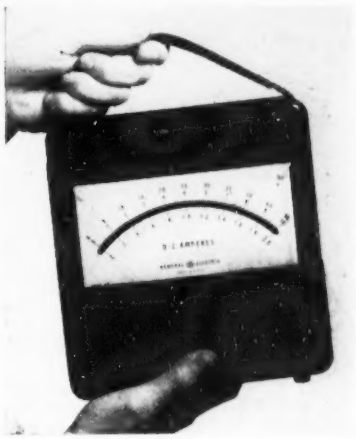
A way has been found to incorporate Hycar acrylonitrile synthetic rubber into the manufacture of new belting providing it with a cover of Hycar on a carcass of Neoprene WRT.

Belting has white color throughout and a smooth cover stated to ensures freedom from impression on product being conveyed. It is available in widths up to 48 in. and can be vulcanized endless at maker's plant or in field.

Belting is designed to withstand severe exposure to vegetable oils such as in conveying of potato chips and all kinds of biscuits and crackers. For normal uses White Supertex Type WRT, made in various thicknesses, is still recommended.—*Baldwin Belting, Inc., 483 Washington St., New York, 13.*

Circle 109C on Reader Service Card

Portable Instruments Aid Electrical Maintenance



Maximum convenience and readability are features claimed for two new series of improved, portable electric instruments, Type DP-11 and DP-12 to indicate volts, watts, amps, and milliamps.

DP-11 was designed for general testing for electrical maintenance men who need a rugged, easily-read indicating instrument with an accuracy of $\frac{1}{2}$ of one percent of full scale.

DP-12 is a high precision testing instrument designed for laboratory, field, and production use. Accurate to $\frac{1}{4}$ of one percent of full scale, this instrument is particularly suited to the maintenance of portable or switchboard instruments, control panels, and numerous production devices.

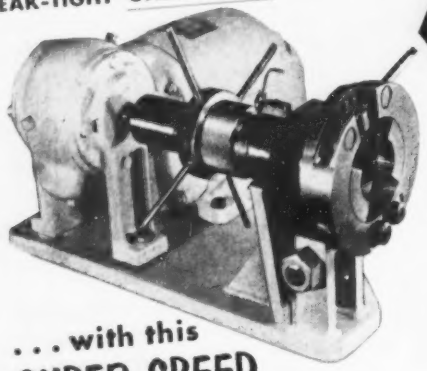
Instruments are encased in moulded Textolite having heavy ribbing and rounded corners in order to reduce breakage. Even under the roughest handling and operating conditions the spring mounted jewel bearings prevent damage to the indicating mechanisms, according to maker's engineers. Longer, easy-to-read scales, covered by unbreakable moulded windows permit increased readability in both of the new lines. Pointer scale is balanced on a thin knife-edge for optimum indicating accuracy.

Mechanisms of both instruments are similar in function and precision.

HOW TO CHANGE TO CLEANED-IN-PLACE LINES IN TWO SIMPLE—LOW COST STEPS

CONVERT EXISTING BEVEL SEAT UNIONS TO LEAK-TIGHT GASKET SEAT UNIONS . . .

Step 1



. . . with this

SUPER-SPEED CONVERSION TOOL

With the simple, positive Super Speed Conversion Tool, you can now accurately and easily convert sanitary *bevel seat* fittings and unions to close-fitting, leak-tight *gasket-seat joints*—to be used as regular "take-down" lines or "cleaned-in-place" piping.

CHECK THESE FEATURES: No dimensional change made during conversion . . . end-to-end dimensions of existing pipe lines remain the same; Convert present lines to C-I-P lines . . . can be done progressively and used while changeover is in progress; Convert bevel seat to gasket seat with substantially flush interior, crack-free, leak-tight joints; Hycar gaskets are precision molded, self-positioning, smooth, non-toxic, fat resistant, non-absorbent, and can be sanitized by steam to 250° F.

and here's the result!

View above shows the accurate, clean-cut grooves made in the fitting ends by the Conversion Tool to receive the precision-molded Hycar gasket. Gasket is self-positioning on both male and female ferrules or fitting ends. Completed joint is ready for C-I-P installation. Tools are available in both motor-driven and hand-operated models, to convert 1½", 2", 2½" and 3" fittings.

GRADUALLY CHANGE TO *TRI-CLAMP* CLEANED-IN-PLACE LINES . . .

After converting existing fittings, you can extend lines with Tri-Clover TRI-CLAMP fittings . . . which provide a joint consisting of a flange type ferrule, precision molded gasket, and the TRI-CLAMP itself . . . a spring clamp which grips ferrule edges with a snap-action toggle assembly . . . always ready for instant assembly or disassembly.

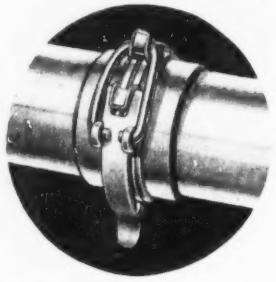
Step 2

TRI-CLAMP recessless ferrule, showing grooved lip to receive molded gasket.

Special precision molded Hycar gasket provides equal pressure around joint.

TRI-CLAMP positive snap-action spring clamp, with toggle locking device securely attached.

At a flick of the wrist, you complete a positive sanitary leak-tight joint. When used in either "take-down" or "C-I-P" installations, substantial savings have been made in initial material cost per joint over conventional union nut ferrule assemblies. When cleaned in place, users have reported substantial reductions in cleaning costs by the use of TRI-CLAMP stainless steel fittings.



The new TRI-CLAMP stainless steel series is available in the full line of Standard Sanitary Type fittings and valves, for both "permanent" and "take-down" sanitary lines, in 1½", 2", 2½", 3" and 4" sizes, all fabricated from type 304 stainless steel . . . offering highest quality material and workmanship.

CT353

Tri-Clover MACHINE CO.

Kenosha, Wisconsin

TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

TRI CLOVER

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE Complete LINE

See your nearest TRI-CLOVER DISTRIBUTOR

Each contains a moving coil and a concentric magnetic structure with a soft iron core. Two alnico magnets are die-cast inside a soft steel ring. Moving coil and iron core are mounted in a separate die cast frame fitting between the magnets.

High torque and dependability in all ratings, including microammeters is assured by high flux density provided by magnets. When instruments are used side by side or when stray magnetic fields are encountered, anti-magnetic shielding of internal mechanism reduces interference and minimizes error.

Each instrument measures 7-3/4 x 7-3/8 x 3-1/4 in. and weighs 5 lb.—*General Electric Co., Schenectady 5, N. Y.*

Circle 109D on Reader Service Card

Pressure Jet Cleaner Simplifies Tough Jobs

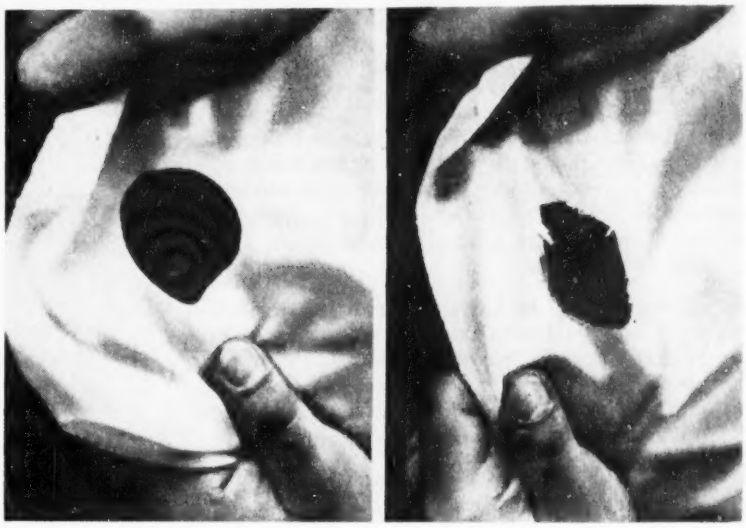
Those heavy duty cleaning jobs are reported speeded and simplified with use of jet cleaner, the Speedyelectric Hydrajet. Unit is termed ruggedly built to give years of service.

Scalding hot water and soap, 4 to 8 gpm, at nozzle pressures up to 600 psi. provide, under finger tip control of the operator, hydraulic jet. To further accelerate cleaning action, suitable detergents or solvents may be introduced intermittently or continuously in any desired, automatically controlled concentration.

Where central plant steam is continuously available, even at low pressure, unit can be easily installed—requiring only connections to existing steam lines and electric power sufficient for a 3-hp motor. If central plant steam is not available, a speedyelectric boiler provides safe, dependable source of "steam at the flick of a switch."—*Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass.*

Circle 111A on Reader Service Card

Cuts Synthetic Cloth, Edges Are Ravel-Proof



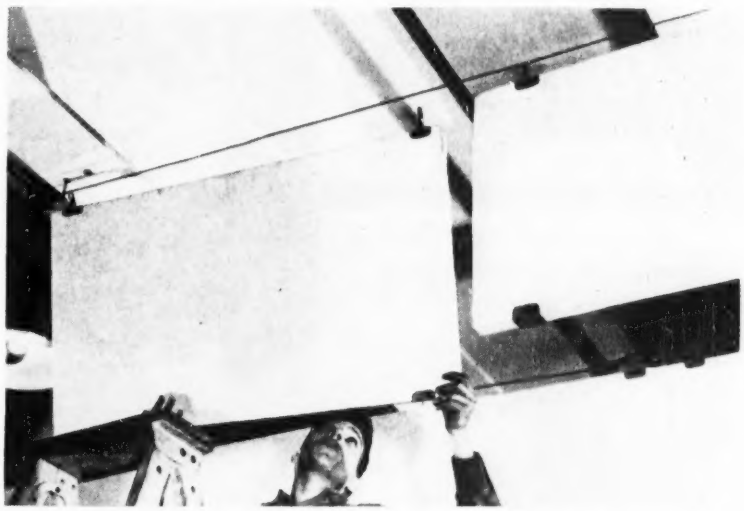
Through use of a recent development, heat sealed, ravel-proof holes and edges can now be cut in synthetic fiber, chemical-resistant filter cloth.

Fabrics are cut with specially designed, electrically heated blades. Cutters melt through synthetic fibers and fuse loose ends firmly together so they cannot separate and unravel. Result is a tightly bonded, dependable edge.

New equipment permits sealing the raw edges of holes and odd shapes that formerly could not be hemmed or stitched economically. Maker is now in production of yard goods heat-cut to any width, and is using new process in custom fabrication of bags, tubes, sacks and filtering units for all types of rotary and pressure filters, centrifuges, and dust collectors—*Filtration Engineers, Inc., 155 Oraton St., Newark 4, N. J.*

Circle 111B on Reader Service Card

New Baffles Stop Noise, Are Easy to Install



Higher worker efficiency and reduced absenteeism has been noted in plants after installation of noise-stop baffles.

These sound absorbing non-combustible Fiberglas baffles may be hung easily and quickly where a conventional acoustical ceiling is impractical because of obstructions like monorails, bus bars, sprinklers, lighting fixtures, pipes or girders.

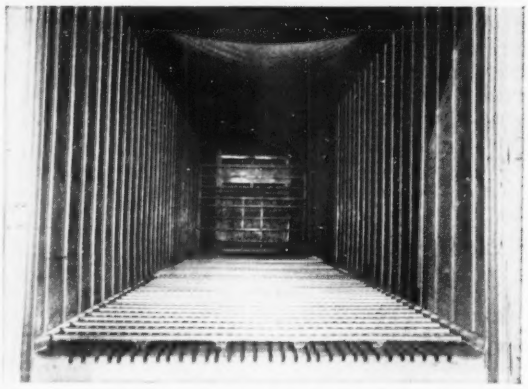
Baffles are made of fine fibers of glass bonded with a thermosetting

"...we are highly pleased with the results of this test..."

"Working with the U. S. Dept. of Agriculture we conducted a transcontinental test run on the handling of frozen orange juice, and I can now say we are highly pleased with the results of this test, using a 35-foot Trailmobile semi-trailer refrigerator van," reports Mr. J. A. Podmore, General Traffic Manager, Minute Maid Corp., Plymouth, Fla.

"Carrying 1500 boxes of orange juice (approx. 35,000 pounds) the 6-inch insulated Trailmobile running from Plymouth, Florida to Los Angeles, California, in five days, delivered the cargo at temperatures *below* those when the cargo was originally loaded. See the day-by-day log showing temperature variations at lower left."

This controlled test confirms the performance that's quality-engineered into every Trailmobile. This reefer van is one of a wide variety of models built to meet any hauling need. Call your friendly Trailmobile Branch Office for full information on the type that's best for your transport requirements.



"Trailmobile refrigerator van insulated with 6" of Ultralite all around is seen just prior to loading for test run. Note specially designed aluminum racks on floor and canvas duct on ceiling to facilitate free air circulation."

"Here's the new 35-foot Trailmobile refrigerated trailer owned by Jaka Packers, Inc., Los Angeles, and used in the test run. The trailer has 6-inches of Ultralite fibre glass insulation with three sheets of double reflection paper. One sheet is next to the outside aluminum skin of the trailer, the second is sandwiched between the two 3-inch layers of Ultralite and the third sheet next to the inside walls of marine plywood. The ceiling and doors are similarly insulated, the doors having triple rubber seals. The bottom of the Trailmobile has similar insulation under aluminum extruded flooring. Vertical wooden battans are spaced 12" apart along sides to insure adequate vertical circulation. Special 2" high aluminum floor racks give cold air circulation for bottom load. Mechanical refrigeration was employed using a Transicold 1R-101 transport unit."

TRAILMOBILE-TRANSICOLD LOG

Plymouth, Florida – Los Angeles, Calif. Test Run
(citrus concentrate)

Date	Location	Time	Box Temperature	Ambient
12-4	Plymouth, Fla.	3:30 p.m.	plus 50	65
12-4	Plymouth, Fla.	4:15 p.m.	minus 4	
12-4	Orlando, Fla.	5:00 p.m.		
12-4	Ocala, Fla.	11:00 p.m.	minus 20	55
12-5	Ocala, Fla.	8:00 a.m.	minus 20	58
12-5	Bainbridge, Ga.	4:00 p.m.	minus 20	72
12-6	Selmer, Tenn.	9:45 a.m.	minus 24	50
12-6	Little Rock, Ark.	2:30 p.m.	minus 23	65
12-7	Dallas, Texas	3:30 a.m.	minus 24	50
12-7	Dallas, Texas	2:20 p.m.	minus 25	70
12-8	Las Cruces, N. M.	11:00 a.m.	minus 19	65
12-8	Lordsburg, N. M.	2:45 p.m.	minus 20	72
12-9	Los Angeles, Calif.	7:30 a.m.	minus 20	55
12-9	Los Angeles, Calif.	10:30 a.m.	minus 20	

T/M TRAIL-MOBILE

The Trend is to **TRAILMOBILE**

PULLMAN

TRAILMOBILE INC.

CINCINNATI 9, OHIO — BERKELEY 10, CALIFORNIA

Friendly Sales and Service from Coast to Coast

For more information, use coupon on page 157.

binder into a rigid panel, 24 in. wide, 48 in. long and 1½ in. thick. Baffle is enclosed in an opaque plastic film. Stainless steel wires, inserted through the board, are formed into a hook at top and secured to top and bottom of baffle with stainless steel saddles.

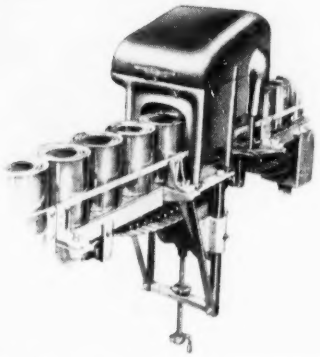
This acoustical treatment absorbs sound from clattering machinery that would normally strike unyielding surface of the ceiling and bounce back to working area. Sound waves striking surface of baffles are transmitted by diaphragmatic action of plastic film to millions of tiny, dead air pockets between fibers of glass that compose baffle.

Baffles are washable. Dirt, water or grease will not injure plastic film. If plastic becomes soiled, it can be washed with ordinary soap or mild detergents and warm water.

Each baffle weighs 6 lb. and can be installed quickly and easily. Baffles are hung on wires stretched over an open area. Wires are spaced according to amount of noise reduction desired. The closer the rows, the more effectively they can reduce shop noises. In an average installation, baffles are hung on wires spaced between 3 and 7 ft.—*Owens-Corning Fiberglas Corp., Toledo 1, Ohio.*

Circle 111C on Reader Service Card

New Container Marker Is Self Operating



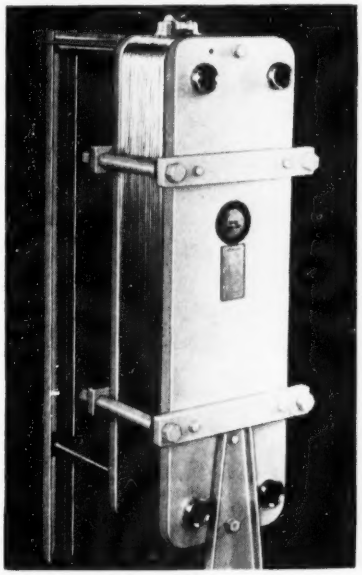
Filled metal or glass containers are marked at high speed by this new self operating unit.

Called the Bruceway Marker it requires no outside power. It is operated by movement of containers along conveyor line. Moving containers rotate a pair of starwheels which in turn actuate stamping wheel. Thus, containers actually mark themselves. There is no restriction as to speed. Only determining factor is speed of containers moving along line.

The models are offered, both adjustable to conveyor widths and container sizes. Model No. 400 handles containers from 2 to 8½ in. high, 1¾ to 3¾ in. dia; Model 600 (illustrated) from 2¼ to 12 in. high and 3 1/16 to 7½ in. dia.—*Barry-Wehmiller Machinery Co., 4660 W. Florissant Ave., St. Louis 15.*

Circle 113A on Reader Service Card

Plate Type Heat Exchanger For Small Volume Runs



Recommended for heating or cooling aplications which will require only infrequent opening of press, in this new, low-capacity, plate-type heat exchanger, the Model SI-30 "Superplate".

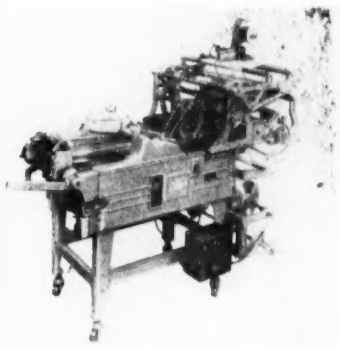
Unit can be used for continuous heating or cooling of milk, wine, beverages, oils, and other liquid food products.

Important feature of press is fact that plates used with it are same as those provided for standard model "Superplate". Thus, when capacity must be increased beyond limits of this unit only press need be replaced. Plates have a surface of many knobs which create turbulence and thereby provide rapid heat transfer. Each plate is made of stainless steel, stamped out of one piece, with no welds or corners to catch and hold dirt.

A maximum of 30 plates can be used with this press when there are no intermediate terminals, and as many as 19 plates when an intermediate terminal is required. Exterior surfaces have a zinc metalized finish further protected by paint. Overall length is less than 3 ft. and height less than 5 ft.—*Cherry-Burrell Corporation, 427 West Randolph St., Chicago 6.*

Circle 113B on Reader Service Card

Makes Cellophane Bags That Have Tear-Tapes



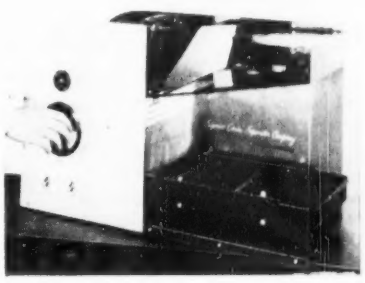
With use of a new attachment, cellophane bags can now be made with a "tear-tape" strip.

Unit automatically applies a "tear-tape" strip to inner side as bag is formed from flat stock. Two small knifes at cutting head nick folded bottom seal to provide an easy start to tearing action. A nicked area is also provided on crimped bottom bags.

A gentle pull on tear-tape strip completely opens packaged products such as macaroni, noodles, beans, rice, or candy. Attachment in no way reduces speed or efficiency of bag making operation, maker's engineers pointed out.—*Simplex Packaging Machinery, Inc., 534-23rd Avenue, Oakland 6, Calif.*

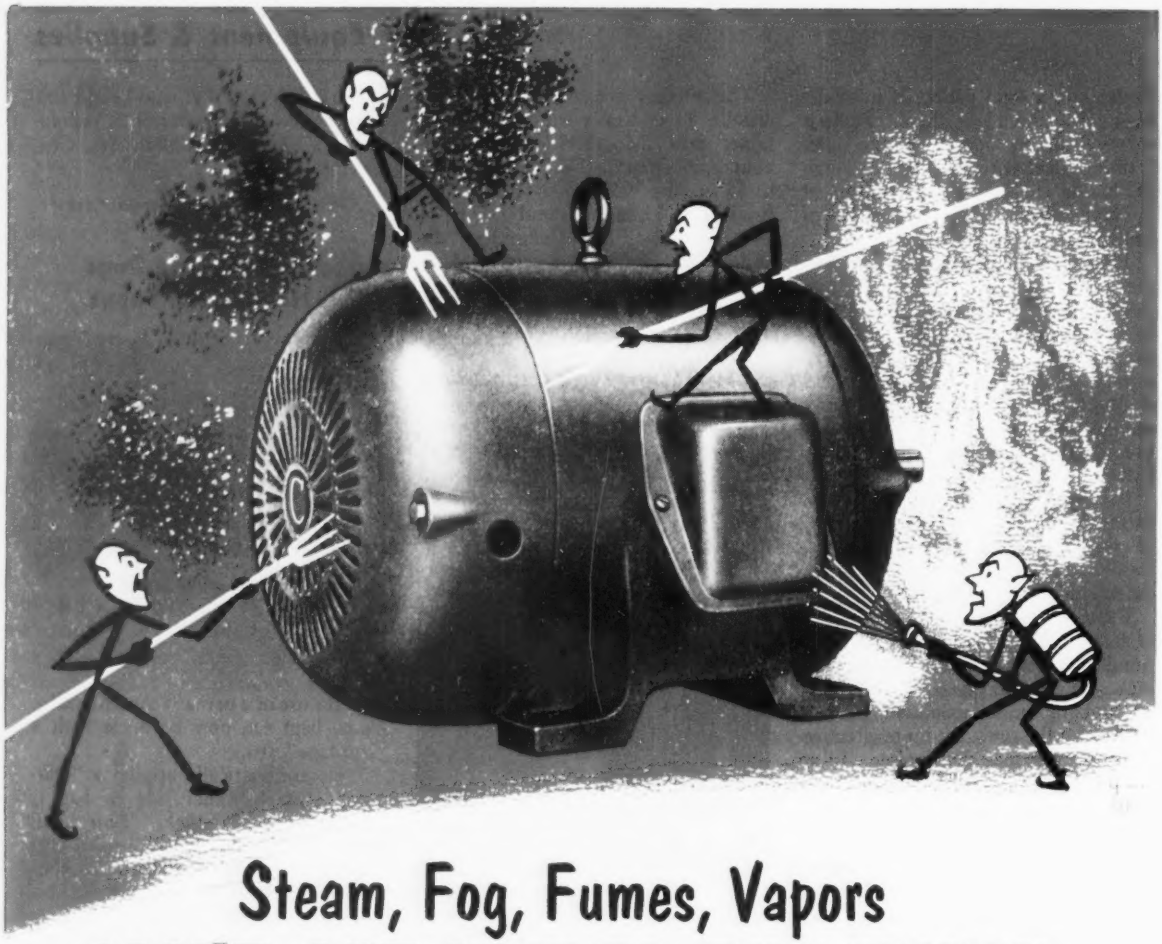
Circle 113C on Reader Service Card

Air Jet Separator Unit Is Compact, Portable



A wide variety of applications for the milling trade is claimed for this new air jet separator.

Portable, compact unit allows mil-



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lers to accurately determine whether a given stock can be separated, and to what extent. Combined with a sieving machine, separator can be used to reproduce actual milling in laboratory.

Many other questions as to purifier performance can be analyzed with this machine. Maker states it will reveal why one purifier does a better job than another; whether a purifier is set to produce best results; which purifier is worn to a point that it will no longer do a satisfactory job. Separator is termed unique in that stock falls through three high-velocity streams of air in separating process. It weighs 32 lb., is portable and can be plugged into any 110-125-v. outlet. Calibrated dials give precision control of air and feed, and make it possible to return to previous settings at any time.—*Superior Grain Separator Co., Hopkins, Minn.*

Circle 113D on Reader Service Card

New Chemicals

Plastic Liner for Drums Goes In Fast, Easy

Ease of insertion is claimed for new polyethylene drum liner. Circular disk liner-bottom does the trick.

New liner eliminates use of mandrels, normally necessary and is stated to avoid creases which sometimes result in leaks and ruptures.

Fibre disk between two layers of polyethylene forms circular bottom. Liners range in gage from .0015, often used with smaller drums and less corrosive products, to heavy .006 for use with highly corrosive products. They are available for use with both steel and fibre drums ranging in capacity up to 55 gal.—*Mehl Mfg. Co., Div. of Sydney-Thomas Corp., Cincinnati.*

Circle 115A on Reader Service Card

New Chlorine Germicide Is Highly Effective

Antibac, a new type chlorine germicide is reported to combine safety and other advantages of organic type with fast, lethal action of hypochlorites.

New germicide is claimed to give greatly enhanced killing speeds because its use-solutions are mildly acidic. Stability and long service life are also claimed for product.

Solutions of new germicide are termed unusually effective in presence of solid and foreign matter. Solutions are clear and free from sludge—sanitized surfaces are free of foreign deposits, films and streaks.

Germ-killing action is said to be largely non-selective. Antibac kills even heat-resistant organisms which other less effective materials fail to destroy according to its producer.

Active ingredient of new product is 1, 3-dichloro-5, 5-dimethylhydantoin. This compound, formerly slowly soluble in water, has been formulated by maker into a product that rapidly dissolves in either cold or warm water.—*Wyandotte Chemicals Corp., Wyandotte, Mich.*

Circle 115B on Reader Service Card

Foaming Agent Imparts Tenderness to Product

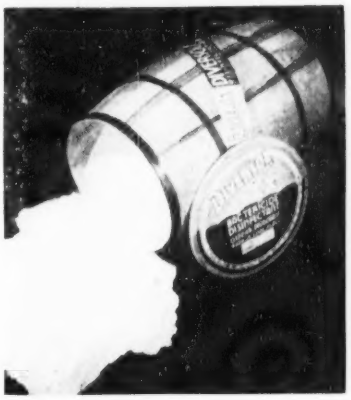
Product tenderness is claimed with use of a new foaming agent, a spray dried, aerating ingredient made from sweet whey solids.

Known as Dairy-Whip, it is an active foaming agent which can replace wholly or in part egg albumin or gelatin commonly employed in aerated food products. Its foam structure does not set as toughened film, thus imparting tenderness to product in which it is used.

Agent, maker points out, is controlled to meet specific whipping requirements. Product can be made available in a spray-dried fine powder in both edible and commercial grades.—*Western Condensing Co., 411 Battery St., San Francisco.*

Circle 115C on Reader Service Card

Pink Color Is Safeguard In New Disinfectant



Distinctive pink color for ready identification marks Diversol CX, a new bactericide-disinfectant cleaner—object, to avoid costly mistakes caused by mixups between disinfectants and other chemical compounds that have caused many processors serious spoilage and waste.

Material helps control bacteria, mold and yeast—guards against spoilage, deodorizes. Other features reported are: Completely soluble, stable, non-corrosive, acts as a water softener and will not stain equipment. It is packed in 325 lb. barrels, 125 lb. drums, and a 25 lb. drum for producers.—*Diversey Corp., 1820 Roscoe St., Chicago.*

Circle 115D on Reader Service Card

OTHER DEPARTMENTS

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In Behalf of Progress . . .

Triple Challenge on Chemicals in Foods

Three key problems and opportunities of the food industry were highlighted by Dr. David B. Hand, a member of the Food Protection Committee, in his personal opinion talk at the IFT meeting.

Every responsible individual in the industry should be familiar with these three keys to the future—should carefully evaluate them—and should do what he can about them.

"The time is opportune," Dr. Hand observed, "for the formation of an industry Board, with the assignment of dealing with all problems concerning protection of food safety.

"Such a Board, working closely with government agencies and with independent scientific groups, such as FPC, would be able to contribute to the interests of the public—not only in safety but also in the continuation of technological progress."

We have been of the opinion that the IFT is missing a golden opportunity by not appointing a committee which would actively fulfill this Board function.

This is, in fact, a three-ply goldén opportunity. It would serve the public. It would help the industry. And it would build new prestige for IFT.

Next best bet would be for Grocery Manufacturers of America to set up such a Board, composed of technical executives from member companies—with authority to speak for GMA on technical matters.

If neither of these steps are to be taken, leading food and ingredient manufacturers should establish a new association—perhaps called the Food Protection Institute—to fill a need that has too long existed.

It is, indeed, a silly situation when a great industry like ours has no "spokesman" in its behalf.

Now we come to Dr. Hand's point No. 2.

"One major weakness in the federal food law is that it provides no definition of what is meant by poisonous and deleterious substances."

While no change is needed in the food law for public protection, the law has a glaring gap in respect to the protection of food and ingredient manufacturers. There are no standards for measuring toxicity.

It is a bit difficult—and sometimes costly to the tune of several hundred thousand dollars—to try to prove the safety of a new food additive. Food and ingredient makers are entirely at the mercy of a sometimes dictatorial Food & Drug Administration—or at the mercy of uninformed courts which take F&DA opinions as the basis for their decisions.

Specific toxicity measurement standards are badly needed—and we don't refer to such vague yardsticks as "not generally recognized as having been adequately tested."

Not easy to set such standards? Of course, not. But it can be done.

The present unfortunate situation not only stymies progress, but it denies the improvements to which the public is entitled.

Like the nonexistence of a group to speak for the industry—it is a silly situation. No standards for measuring something of importance to a great industry and of vital concern to every man, woman, and child, in the country.

This brings up the No. 3 point of Dr. Hand.

"The key argument in favor of amending the law to require prior approval (of new chemical additives) is the statement that there are over 700 chemicals used in foods, of which 276 have not been proved safe. This statement has been read into the record and highly publicized.

"It gives an exaggerated impression of the urgency of the problem and is bound to have considerable influence on people who are not fully informed. The only effective way to counteract this statement is to present the facts."

So through a Subcommittee of Food Technology, the Food Protection Committee is making a study of chemical additives. A questionnaire to food companies asks for information on the use of additives in major processed foods—some 70 products representing about 90 percent of consumption.

Considerably less than 700 chemicals are contained in these 70 products, and there is no indication that any of them presents a serious health hazard, Dr. Hand points out. Many of the chemicals used in foods appear in extremely small amounts. And in some cases they are restricted to a few specialized foods.

It is urgent that there be collected and publicized information of an authoritative nature on the use of chemical additives. It is necessary to know the extent to which they are used—and to know how much of each enters the diet.

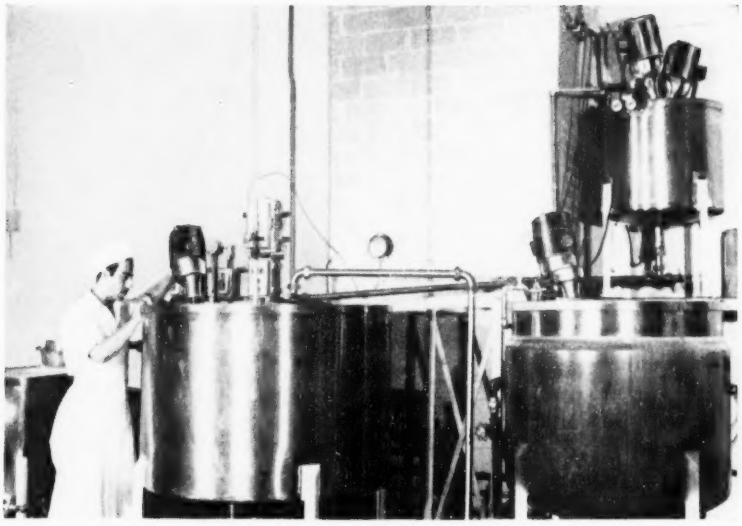
That's why the FPC questionnaire should be answered.

Don't be deterred from providing this information on the basis that it is bad public relations to talk about chemicals in foods. That argument may have held ten years ago. Today, it doesn't.

Telling the truth about chemical additives now is a conservative and constructive move. The truth will look very good and wholesome in comparison with the exaggerated and inaccurate scare statements made in recent years by the overzealous do-gooders and publicity seeking politicians.

And aside from that, the people do have a stake in full and accurate knowledge of the ingredients in the foods they eat. Anyway, the chemical additives in the standardized foods already have been named.

All in all, its time to get on the chemical ball.



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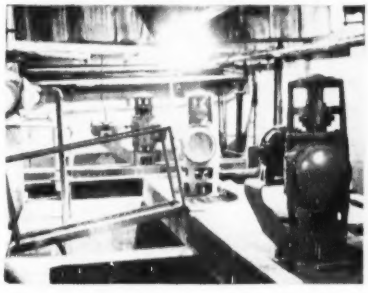
LIGHTNIN top entering propeller mixers, for open or closed tanks. Sizes ¼ to 3 HP.



LIGHTNIN turbine and paddle mixers, for big mixing jobs, fit any open tank or closed pressure vessel. Full range of speeds, impellers, materials of construction. Sizes 1 to 500 HP.

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TURN PAGE FOR FOLDOUT FLOWSHEET →

Making Quality Fruit-Beverage Base

Grapefruit-Product Line Features Advanced Process, High Control

FOLLOWING conventional conveying of the grapefruit from bins, and washing and sorting steps—Point (1) in accompanying flowsheet—The Squirt Co., Glendale, Ariz., then employs the Citro-Mat to extract juice under controlled, relatively light pressure to eliminate peel-water in the juice.

From this point on, juice is handled only in stainless steel equipment. That from the extractor first flows through a finisher, which removes seeds, rag, and membranes, then through a float-valve into the vacuum deaerator, thence to the tank supplying the pasteurizer.

To completely inactivate enzymes naturally present in the juice, pasteurization is at 198 deg. F., with holding at this temperature for 20 sec. Water, superheated by steam injection to 230 deg. F., is used. Following sterilization, juice is immediately pumped to the vacuum evaporator and flashed into the concentrator. Oil of grapefruit is extracted from ground peel as an emulsion. Centrifuging clarifies the oil, and it is stored under refrigeration.

Heart of this process is the company designed vacuum evaporator. Devised specifically for this process, it is the third to be fabricated. The calandria in this unit contains 136 stainless steel tubes of 1¼ in. o.d. and 54 in. long, equivalent to 210 sq. ft. internal heating area and an internal volume of 44.4 gal. The two pumps, providing forced circulation and developing a minimum linear velocity of 2 fps., are capable of delivering in excess of 1,250 gal. per minute. These higher velocities are more desirable for heat transfer because of increased turbulence and lowered fouling resistances. Since the system operates under vacuum and at temperatures close to the boiling point, slight increases in heat of the liquid in the calandria results in the rapid formation of vapor bubbles. This ebullition sets up a turbulence and stimulates an increased velocity of flow. A low overall heat transfer coefficient of 180-200 Btu. per hour per sq. ft. heating surface per deg. F. mean temperature difference was used in these calculations.

BEHIND THIS EFFICIENT fruit-process line is the story of how The Squirt Co. applied enterprise-plus to make the big switch from "outside handled" to "inside regulated" operations. It's all told in this month's special feature, "Volume Higher, Costs Lower, and Product Better"—on page 84.

The vapor duct from the evaporator to the barometric condenser was fabricated oversize (30 in. dia.) to keep frictional resistance low. Vapor velocity in this duct is less than 130 fps., as against usual velocities of 200-400 fps. in some installations. Past experience has shown that vapor velocities over 190 fps. resulted in greatly increased temperature differences between the boiling liquid in the evaporator and the heat of the water in the barometric condenser.

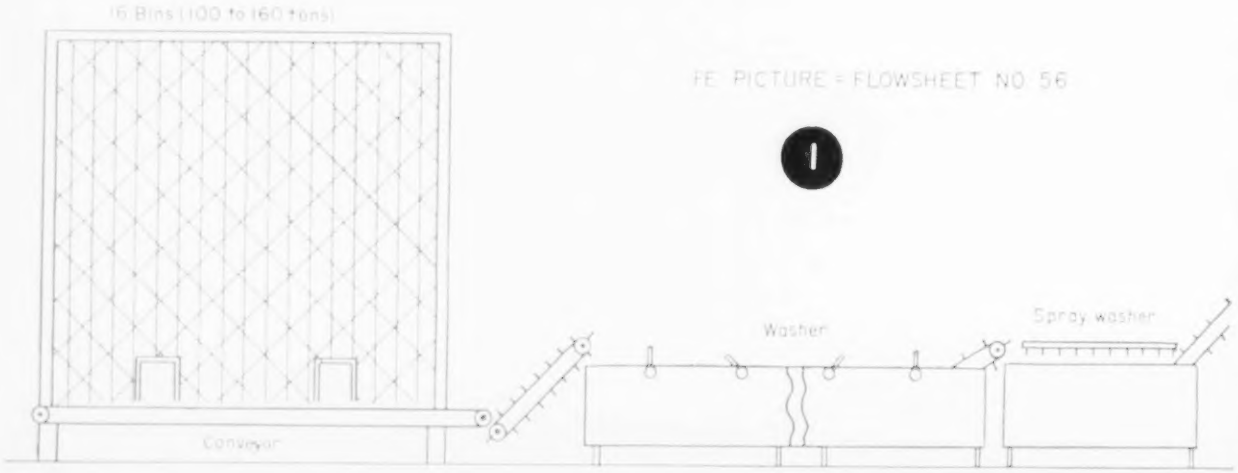
Under average conditions, about 700 gpm. of cool water at 70 deg. F. is injected into the barometric condenser. This water gains in temperature to 83 deg. F. from condensing evaporation vapor.

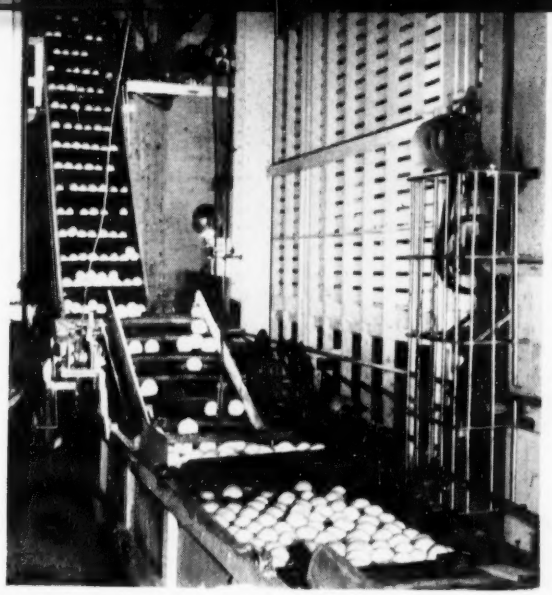
The thermolim unit, governing operation of the Electromax controller, is located at the top of the flash chamber of the evaporator. It measures vapor temperature. This control point is very sensitive to small changes in temperature and is uniform throughout the concentrator operation. The controller is set for 92 deg. F. which, when all other factors are in balance, results in temperatures of not over 100-102 deg. F. in the juice being concentrated.

Early in the production season, when cooling tower operation is more efficient, water is delivered to the barometric condenser at temperatures as low as 60 F. Under these conditions the evaporator has greatly increased capacity. It can concentrate more juice than the line can supply and exceeds the capacity of the boiler to supply steam under these conditions.

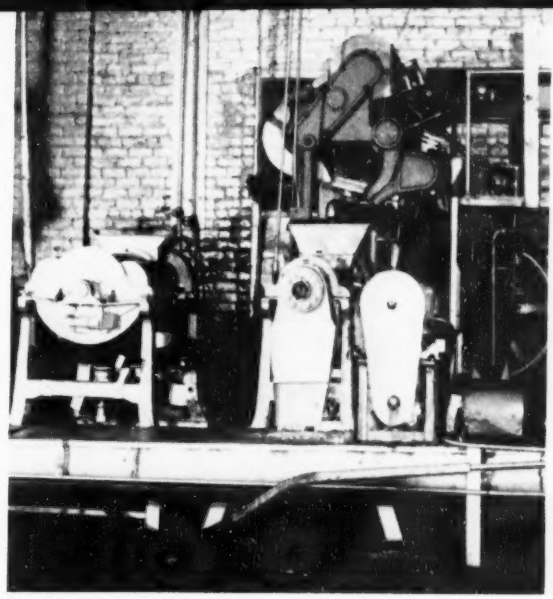
Vapor temperature is reduced to as low as 80 F., comparable to that of some low temperature evaporators operating with refrigerated water. Concentrate produced up to the 92-F. control temperature is of high quality. Color has not been affected and the product does not have a cooked flavor so evident in concentrates produced at higher evaporator temperatures. Operation of this unit at higher temperatures results in slight darkening and development of cooked flavors, the degree depending on the

FOOD ENGINEERING AUGUST 1953 Pages 118-121





1 Fruit is conveyed from bins to washer, where it is brushed in detergent solution, rinsed in clear water, elevated to sorting belt.



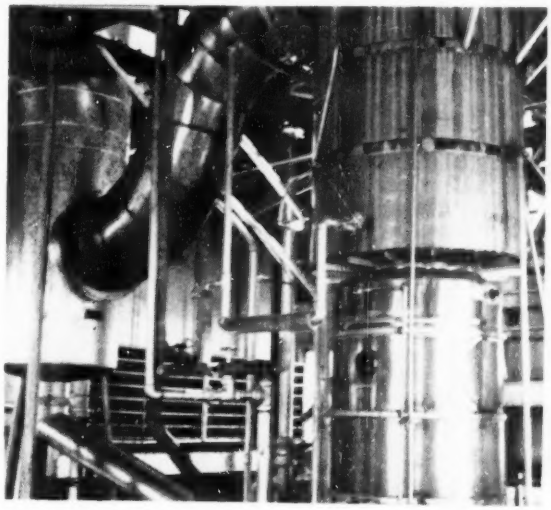
2 Compact arrangement of extraction and peel unit lends efficiency . . . finishers and flavedo reel discharge waste to screw conveyor (foreground).

temperature increases. However, use of temperature lower than 92 F. results in only slight improvement of flavor.

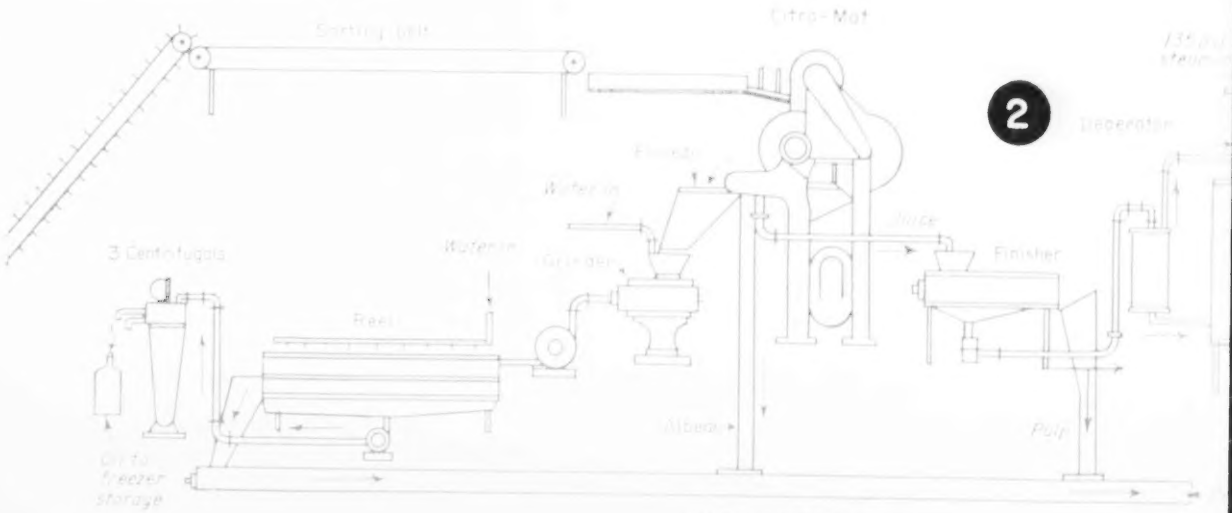
Operation is continuous. Single strength juice is constantly introduced and, after the operating charge has been built up, concentrate is constantly pumped out. Juice enters at the rate of 10 gpm. and concentrate is removed at such speed as to maintain the operating charge at a uniform 56 percent solids.

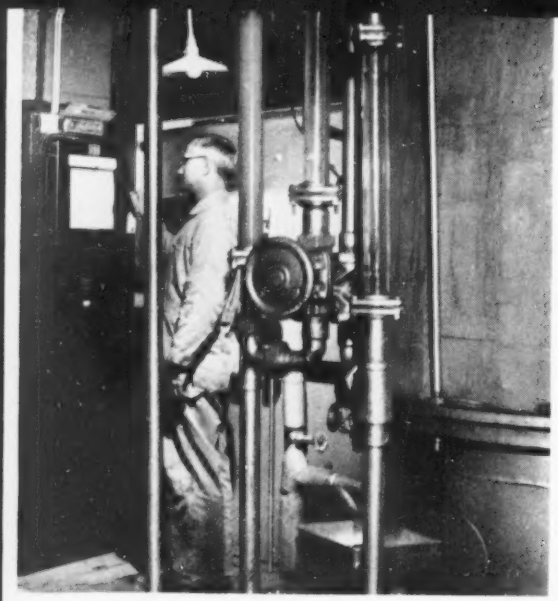
The concentrate is pumped to cold-wall, agitated tanks and its temperature reduced to 60 F.—in Point (4) in the diagram. When a sufficient quantity has accumulated in these tanks, the juice is filled into polyethylene-lined steel drums and stored, subsequently to be blended into beverage base under 36 F. temperature. Until the bottler makes the finished beverage, the concentrate or base is kept under refrigeration, both in transit and in storage.

The Squirt beverage base is a blend of several lots of concentrate, oil of grapefruit, citric acid, and water. Selection of lots on the basis of laboratory production records makes possible a standardized, uniform product. Ingredients are homogenized. After flowing across a lighted glass plate, where operators remove by vacuum undesirable materials, such as immature seeds and coarse pulp, the finished product is bottled. Gallon jugs go into cases that are again returned to refrigerated storage to await shipment by reefer rail cars.



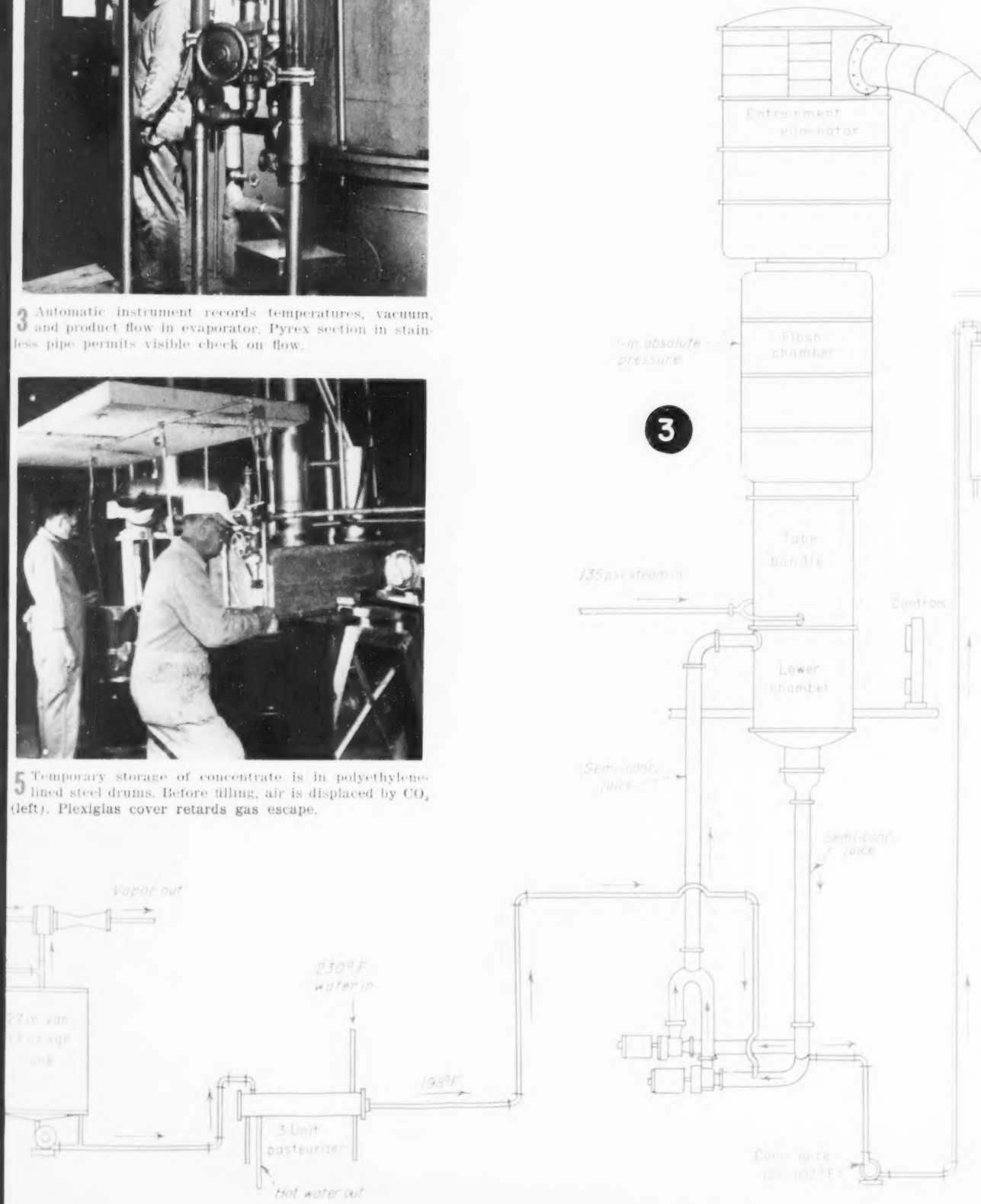
4 Oversize, 30-in.-dia. vapor pipe leads from entrainment separator to barometric condenser. One cooling tower is seen in rear.

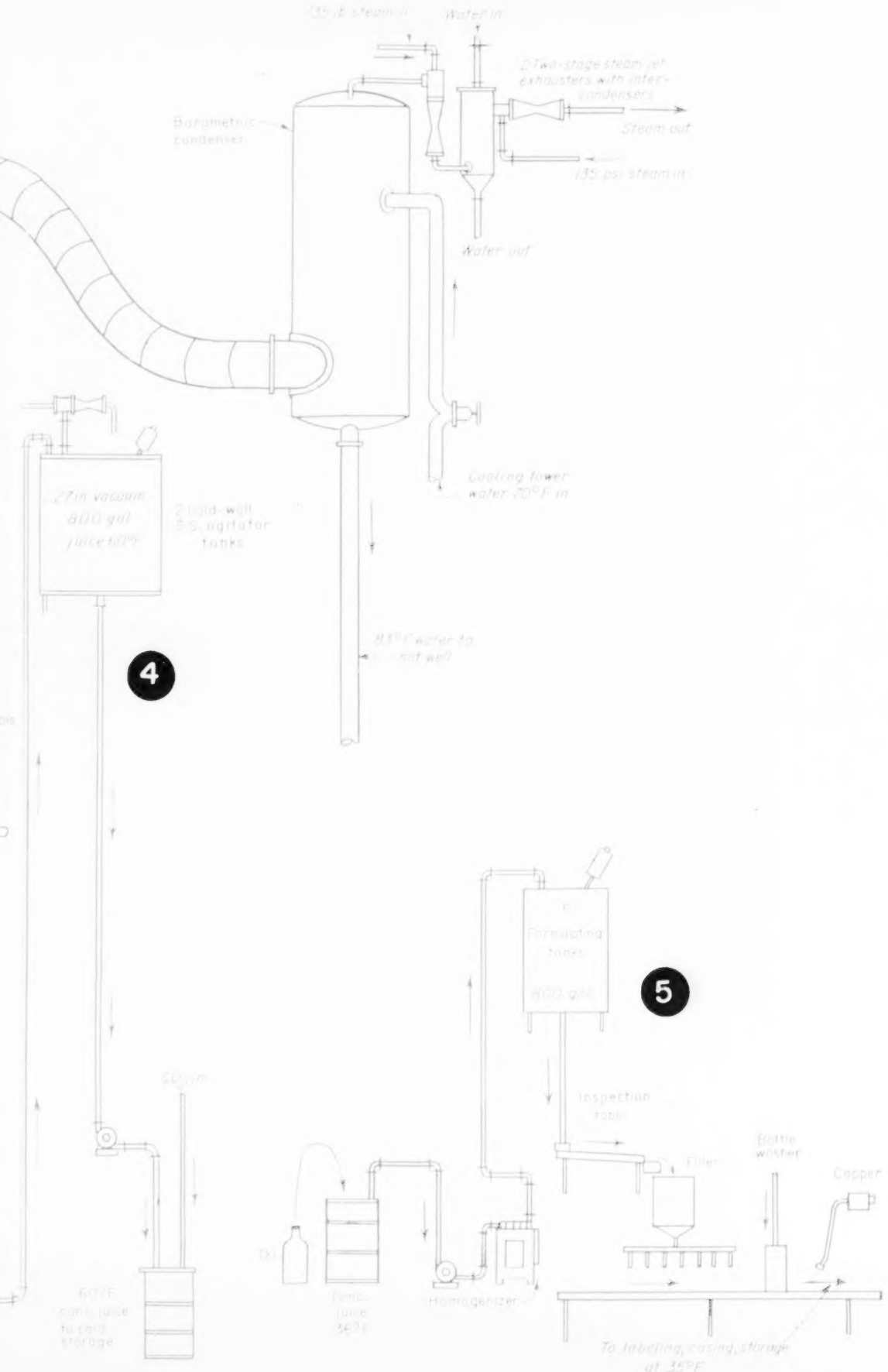




3 Automatic instrument records temperatures, vacuum, and product flow in evaporator. Pyrex section in stainless pipe permits visible check on flow.

5 Temporary storage of concentrate is in polyethylene-lined steel drums. Before filling, air is displaced by CO_2 (left). Plexiglas cover retards gas escape.




135 lb steam in
Water in
2 Two-stage steam jet exhausters with inter-condensers
Barometric condenser
Steam out
135 psi steam in
Water out
Cooling tower water 70°F in
27in vacuum
800 gal juice 60°F
2 cold-wall S.S. agitator tanks
83°F water to hot well
4
5
Formulating tanks
800 gal
Inspection table
Filler
Bottle washer
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To labeling, casing, storage at 35°F

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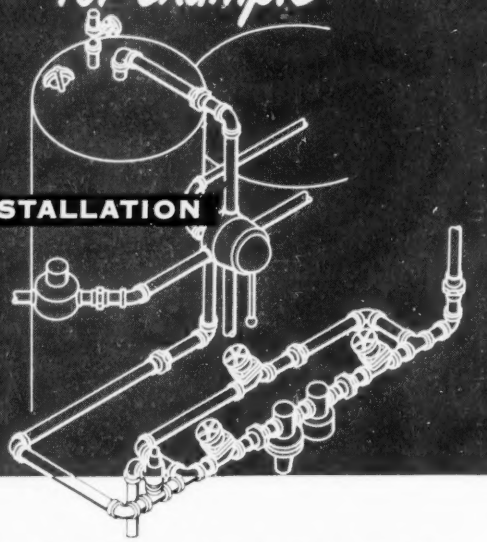


THE INSTALLATION

At the Excello Paper Products Co., Inc., Cincinnati, using Crane Diaphragm valves on city water supply lines; also on plant service water piping, hot and cold.

VALVE SERVICE RATINGS

SUITABILITY:	Doing what other valves couldn't
FEATURES:	Packless - Long Life Diaphragm
MAINTENANCE COST:	No regular maintenance needed
SERVICE LIFE:	Outlasting other valves many times
OPERATING RESULTS:	Safety hazard to personnel stopped
AVAILABILITY:	Crane catalog item - No. 1610

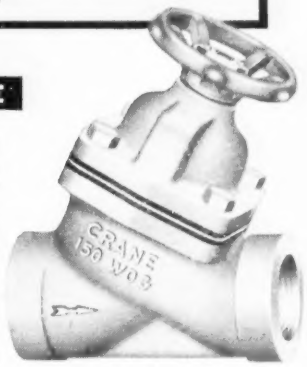
THE CASE HISTORY

Typical of many processes using a lot of water, this plant has numerous open end lines and hose connections. And because of very frequent operation, the valves formerly used in these lines required more than usual servicing to keep up with leakage, dripping hose lines, and hazardous, messy floors.

Crane No. 1610 Diaphragm valves were selected to replace the troublesome conventional valves. Immediately these packless valves stopped the annoyance and expense of stuffing box and seat leakage. Their pliable disc insert ring made a tight seat on open end lines with minimum effort on handwheels.

The replacements were started about 2 years ago. With no attention whatsoever, all Crane Diaphragm valves remain tight, and the plant's water leakage problem remains solved.

THE VALVE



Water is but one of hundreds of fluids Crane Packless Diaphragm valves handle efficiently. Their sealed-to-fluid bonnet and "soft-seating" disc are ideal for all sorts of hard-to-hold liquids and gases; also for sludges, slurries, etc. Separate disc and diaphragm design saves diaphragm wear; permits tight seating even should diaphragm fail. Choose these valves from a wide range of materials, lined or unlined body, for corrosive or ordinary applications. See your Crane Catalog, or your Crane Representative.

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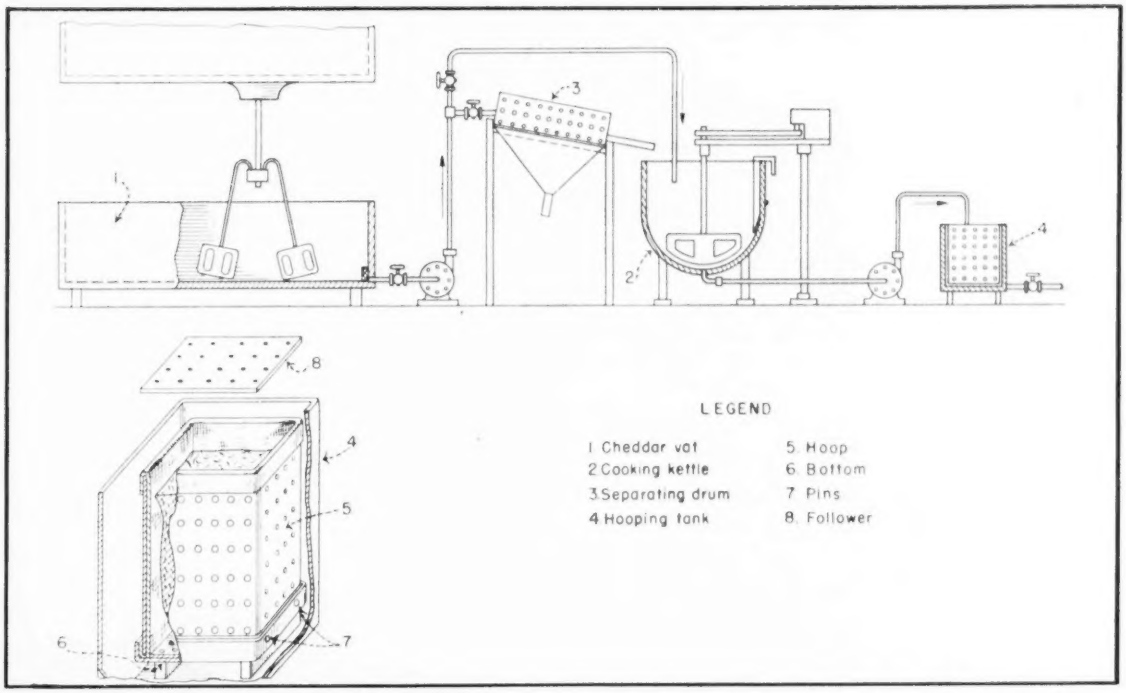


FIG. 1. Flowsheet of improved cheddar cheese process shows how new equipment eliminates hand operations.

New Processing Techniques Speed Cheese Making

By using two starters and specially designed units that eliminate packing, cheddaring, and milling of curd, operating time is halved. Cheese ripens and develops flavor faster than present type product

CHEDDAR CHEESE with body, texture, and flavor equal or superior to that made by conventional methods has been produced by a new short-time process developed at the Bureau of Dairy Industry, USDA.

The new method cuts processing time between addition of rennet and pressing from 5½-6½ down to 2½ hr. Also, most of the hand labor required in present methods is eliminated by doing away with packing, cheddaring, and milling of the curd.

The cheese is waxy and completely free from mechanical openings. A mild, pleasing flavor develops within 3 months at 55 deg. F. Further curing at 50 deg. develops additional flavor.

In making cheese by the new method, two starters are used. One is the conventional commercial lactic starter, the other is a non-hemolytic strain of *S. durans* (SD-A).

The latter culture survives cooking temperatures of 115-120 deg. F., or even 125 for a short time. It grows rapidly and produces acid in milk and cheese at 85-115 deg., but grows slowly at curing temperatures. It also grows well in the presence of salt in curd, whey, and cheese. Commercial lactic cultures, on the other hand, do not survive the cooking and pressing temperatures in combination with salt. They produce little or no acid at temperatures above 105 deg. F.

Special Equipment Used

Several new machines, and other units not previously employed in production of cheddar cheese, were used in the pilot plant operation (see accompanying drawing). They are:

1. A revolving drum 22 in. long x 8¾ in. dia., perforated with approximately 70 holes (⅛ in.). This was used for partial separation of whey from curd.

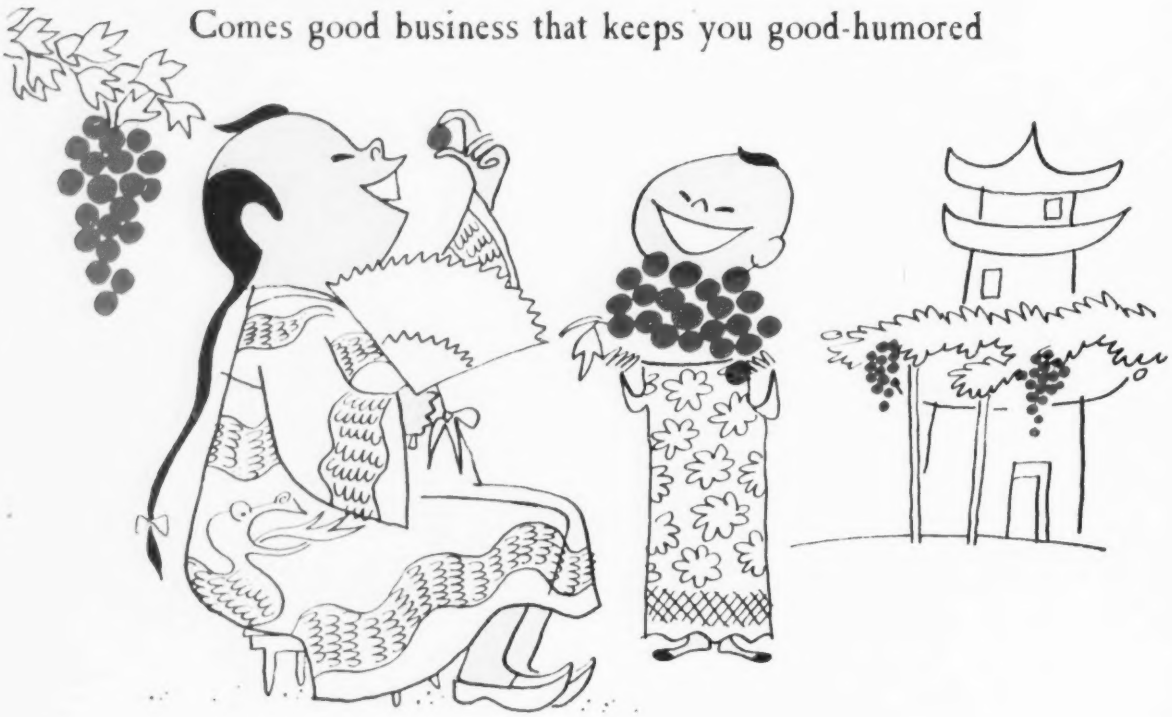
2. A 90-gal. jacketed, stainless steel Swiss cheese kettle equipped with mechanical stirrer. This was employed as a cooker.

3. A new-style cheese hoop comprising a body 11 x 14 x 24 in. high, tray-like bottom 11¾ x 14¾ x 1 in. deep, fastened to the body with 2 pins, and a follower 10¾ x 13¾ in. All parts are ⅛-in. thick and perforated with ¼ in. holes on 2½ in. centers.

4. A hooping tank approximately 16 x 19 x 29 in. with overflow outlet near top and outlet valve near bottom.

5. Positive-action pumps—for transferring curd and

From the gardens of long-ago China
Came the very first Grape, it's rumored;
From the Norda Grape Flavor you use today
Comes good business that keeps you good-humored



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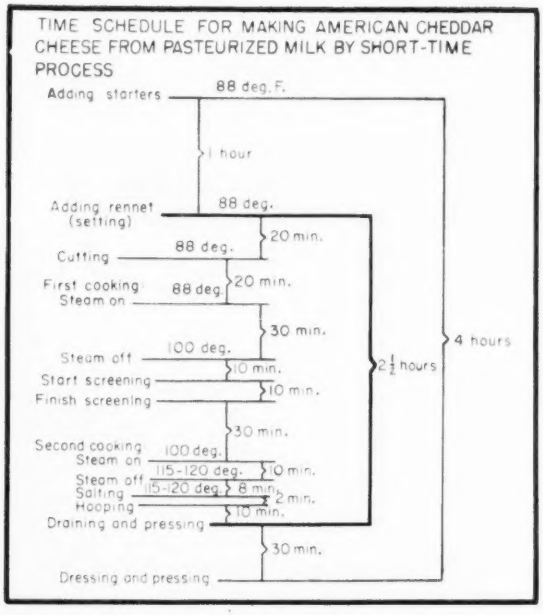


FIG. 2. New method takes only 2½ hr. from time rennet is added until cheese is pressed. Conventional process requires 5½-6½ hr.

whey from cheese vat to separator drum and from cooking kettle to hoop.

On the basis of pilot-plant experiments, the following operations are recommended:

Manufacturing Process

Pasteurization of milk by holding 15 sec. at 161½-162 deg. F., then cooling to 88 deg. and running into a regular cheddar cheese vat.

Adding of sufficient starter (usually 1.5 percent lactic and 0.75 percent SD-A) to give a pH of 5.1-5.3 in pressed curd. If pH is higher than 5.3, additional SD-A starter should be added to subsequent batches. If pH is lower than 5.1, quantity of SD-A should be decreased.

Rennet (4 oz. per 1,000 lb. milk) and color (if used) are added following 1-hr. of ripening. Temperature of 88 should be maintained throughout. Curd is ready to cut in 20 min. (see Fig. 2 for time schedule).

Curd is cut into ¼-in. cubes and stirred continuously to prevent clumping. After 20 min., steam is turned on vat and mixture of curd and whey are slowly heated to 100 deg. (30 min.), and held for 10 min. with slow agitation. Strainer is inserted in vat outlet and about 10 percent of the whey is pumped to cooking kettle and reheated to 100 deg.

Vat strainer is then removed and remaining mixture is pumped to elevated end of revolving drum. Pitch and speed of drum should be adjusted to separate about half of the whey from the curd. Partially drained curd falls into whey in cooking kettle and is reheated to 100 deg. with continuous agitation.

After 30 min. at 100 deg., mixture is slowly heated to 115-120 deg. (10 min.) and held for 8-10 min. to further firm the curd. Salt is added at rate of 4 percent of weight of kettle contents, followed by stirring for 2 min. before hooping.

In the meantime, hoop body and bottom are lined with cheesecloth, body is inserted in bottom and fastened with pins, and placed in hooping tank. A small quantity of whey from receptacle under separating drum is heated to 115-120 deg. and pumped to the hooping tank.

Then salted curd-and-whey mixture is pumped from cooking kettle into the hoop. Discharge outlet from pump line must be turned upward so curd will fall by gravity through the whey. Otherwise air bubbles will be introduced—resulting in mechanical openings in the cured cheese.

Excess whey flows through overflow in hooping tank. It contains 4 percent salt and is therefore unfit for human or animal feed.

As soon as pumping is completed, cheesecloth is carefully folded over curd beneath the whey, perforated following-plate is placed in the hoop, and a 20-lb. press-weight is put on it. Whey is then completely drained from the tank. After 30 min., press-weight and follower are removed, cheese is carefully dressed and pressed for 16-20 hr. at 20 lb./sq. ft.

After pressing, cheese is paraffined or wrapped in film in conventional manner, and cured under usual temperature and humidity conditions. It ripens and develops flavor faster than cheese made by present methods.

Excellent ripening was obtained when cheese was cured at 55 deg. F. for 3-4 months, or at 55 deg. for 2-4 months and at 50 deg. for an additional 2-6 months.

The above article is based on "A Short-Time Method for Making American Cheddar Cheese From Pasteurized Milk" (designated BDI-Inf-158), by H. E. Walter, A. M. Sadler, J. P. Malkames, Jr., and C. D. Mitchell, Div. of Dairy Products Research, Bureau of Dairy Industry, Washington 25, D. C.

• • •

NEW FUNGICIDE

Sorbic Acid

PROSPECTS for greatly reducing the estimated 20 million pounds annual loss of cheese due to mold spoilage have brightened considerably with the advent (and apparent acceptance by FDA) of a new fungistatic agent — sorbic acid.

Furthermore, tests have shown that the agent is especially effective in inhibiting those molds that grow on meats. Also, yeasts and molds during curing of cucumbers. In the latter case, 0.1 percent sorbic acid did not interfere with the normal fermentation process.

Most immediate application method for cheese is incorporation of the fungistatic agent in the wax-coated cellophane wrapping material.

The sorbic acid migrates from the face of the wrapper into the surface of the cheese, thereby protecting the product against mold spoilage.

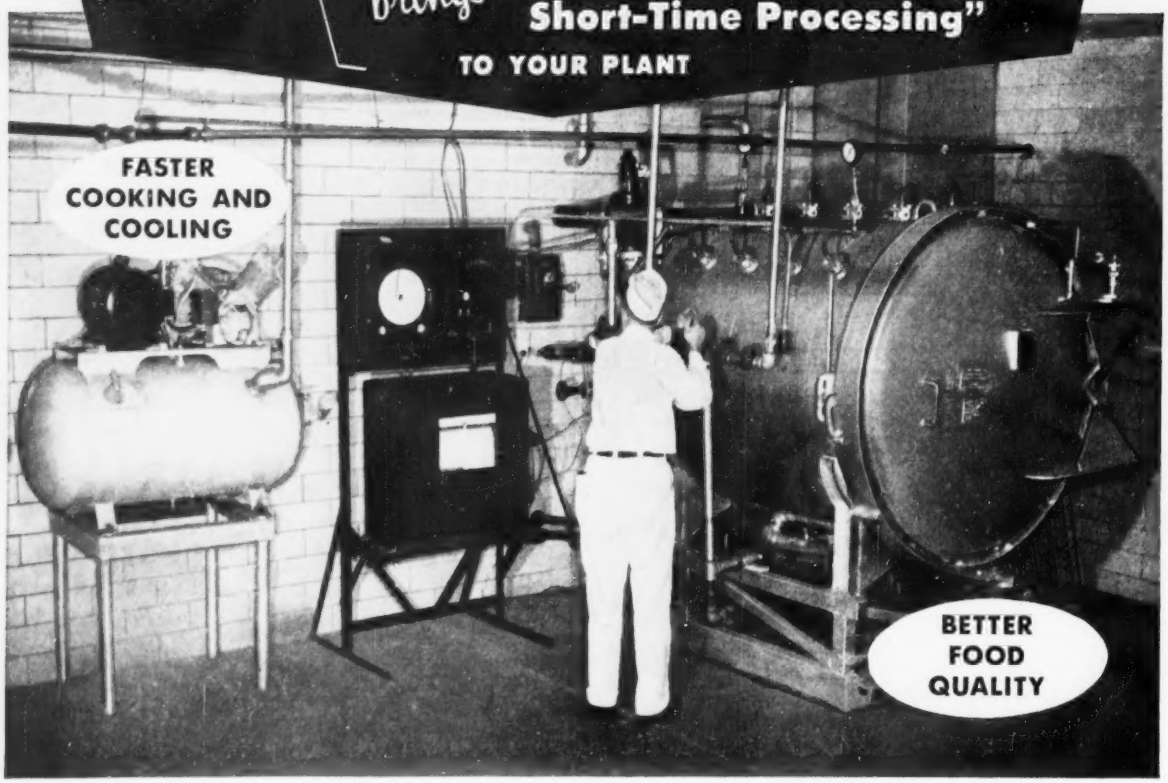
In the past, sodium benzoate has been largely used for this type of protection for foods. But benzoate or benzoic acid are recognized as inhibitors of fatty acid oxidation by liver enzymes and must be detoxified before they can be excreted from the body. The liver is the site of detoxification in the body. Hence, individuals with poor liver functions have difficulty with the detoxification.

Therefore, use of sodium benzoate has carried an onus that required explanation by food manufacturers. Furthermore, it is not adequately effective in certain food product environments.

Sorbic acid, on the other hand, is termed markedly superior to benzoic acid in fungistatic activity, yet is the nutritional equivalent of capronic acid.

(Turn to page 151)

NOW the new REX AGI-TORT STERILIZER brings "High Temperature–Short-Time Processing" TO YOUR PLANT



The Rex Agi-Tort Sterilizer employs the patented* *"end-over-end"* principle of agitation which assures positive, quick heating and cooling of can contents. It's the modern, efficient way to obtain top quality while substantially reducing processing time. Years of research, experimentation and testing have proved "end-over-end" rotation to be best method of obtaining fast, uniform heat penetration. You obtain the proven advantages of "High Temperature—Short-Time Processing" without danger of scorching, over-cooking or under-cooking.

The Rex Agi-Tort Sterilizer is especially suited for sterilizing in large cans—heretofore impractical. Difficult, viscous products can also be sterilized with full retention of quality and flavor. Why not investigate and find out how it fits your processing picture? Write for complete details. Chain Belt Company, 4783 W. Greenfield Ave., Milwaukee 1, Wis.

*Continental Can Co. Patent No. 2,517,542

CHAIN BELT REX COMPANY

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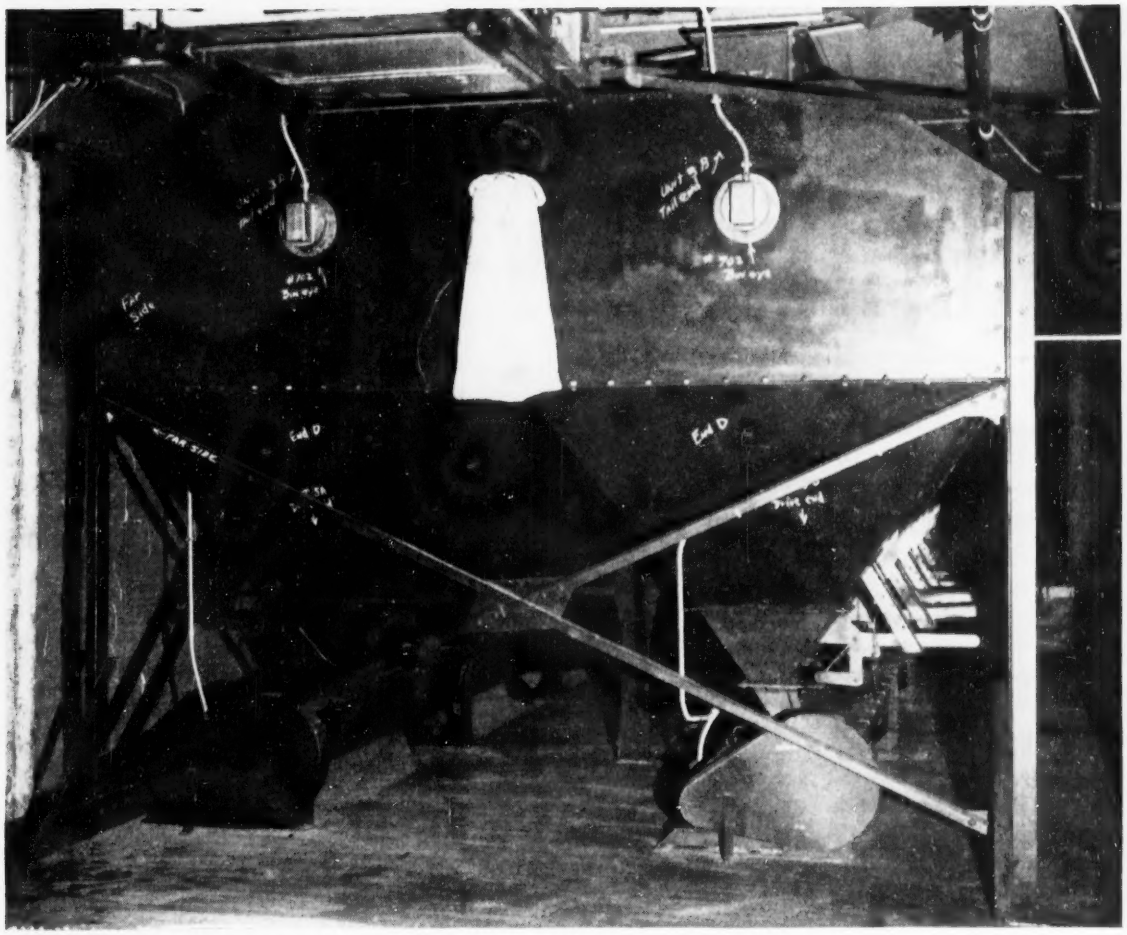

STORAGE BINS for bulk granulated sugar may be located in areas with low headroom. Screw conveyors should be employed to feed and deliver from this type storage bin, composed of a group of pyramid-bottom compartments.

How to Plan *Bulk Sugar Handling*

It can augment your process efficiency, boost your sanitation, cut your labor requirements. But—vital fundamentals of equipment selection and plant layout should be hawk-eyed, to guard those cost-per-pound savings

EDWARD W. MEEKER

Manufacturers & Consumers Service Division, The American Sugar Refining Co., New York City

We may well hail the purchase of sugar in bulk as a star factor in the progressive moves of food processes to mechanize their handling, attain maximum satisfaction, and reduce labor costs.

Already in the plants of large users, sugar is delivered and stored in bulk, either as syrup or in granular crystal form.

For the benefit of other processors, both large and small, who plan eventually to switch from bags to bulk, we will here consider several well-planned handling installations, giving detailed instructions for the selection, use, and care of equipment.

First, let's review critically the advantages to be gained by such bulk operations, noting meanwhile those specific instances where limitations may arise economy-wise.

Points to be Checked

Most pertinent factor to examine is size of operations and, accordingly, volume of sugar required.

If a refinery or distributing center is near your plant, liquid sugar may be delivered in as small amounts as 1,000 gal., or approximately 750 lb. dry weight, provided the supplier has a 3-compartment tank truck. Otherwise, minimum tank-truck delivery is usually 3,000 gal.

Whether dry or liquid sugar is the choice, arrangements should be made to receive the sweetener in the largest volume consistent with production requirements. Deliveries in railroad tank cars (8,000 to 10,000 gal.) are logical for large users or where the distance from the refinery eliminates

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To keep moist products moist and dry products dry — with economy — you can't beat Betner's Flav-O-Tainer bags.

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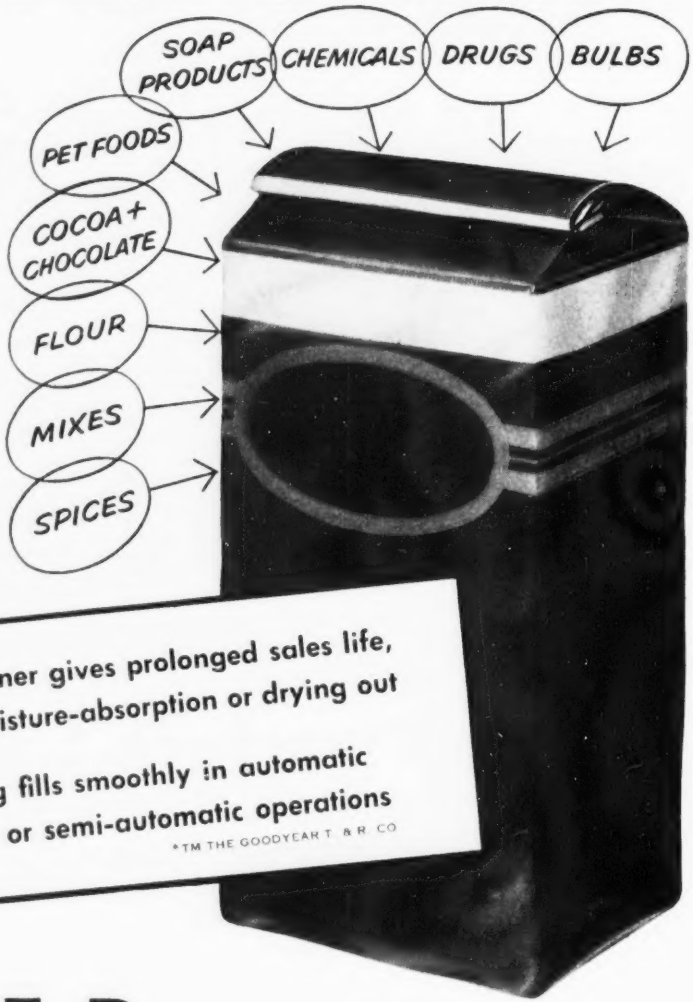
Let us show you what Flav-O-Tainer can do for you. And ask about Continental's Tailor-Made Package Service which makes available the finest in engineering and research.



PLIOFILM* liner gives prolonged sales life, prevents moisture-absorption or drying out

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possibility of enjoying economical tank-truck deliveries.

The tank cars used are of steel with protective linings. Tank trucks may be the same, or may be constructed of stainless steel and insulated when climatic conditions require. When volume of sugar required and plant location permit, most economical delivery is bar barge or tanker. Several plants situated on waterways now buy in these quantities.

When deliveries are by tank car, the user provides unloading facilities. Tank trucks are pump equipped. From tank cars, discharge may be by gravity or by pump. By a simple piping arrangement the same pump can be used for car unloading and circulating in the plant. A 25-gpm. pump driven by a 3-hp. motor is usually adequate. User provides the 3-in. flexible hose that connects with car discharge pipe.

Considering floor-load requirements, storage should be arranged in the plant basement—in either dished-head vertical or horizontal tanks. Here, two or more tanks should be installed, each with capacity in excess of a unit delivery.

There should be protection against both high and low temperatures and also against excessive temperature fluctuations—for accessory equipment as well as storage tanks. For sustained low temperature may cause crystallization of syrup that is saturated at normal temperatures. And heat may cause discoloration, and fluctuation, will encourage moisture condensation on head space areas. Consequent surface dilution, permitting fermentation or molding, may follow. Ideal temperature is 75 deg. F.

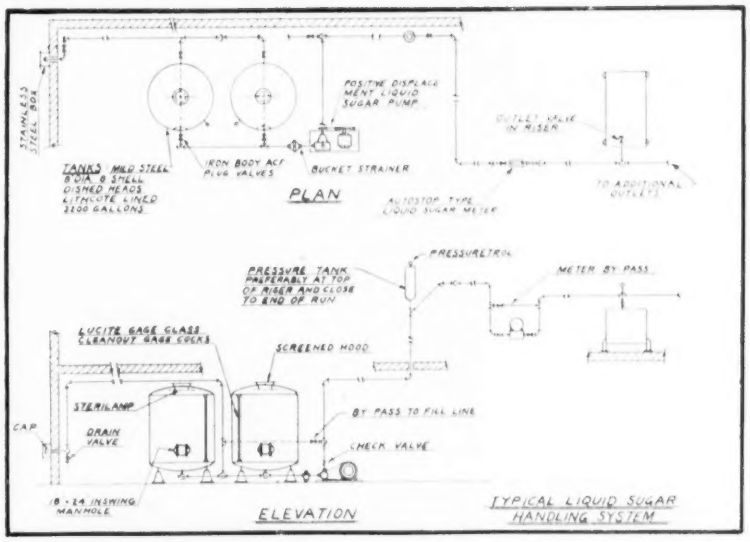
Obviously, storage should not be near boilers. And pipes should not be next to steam lines. While ultraviolet lamps will minimize air-borne contaminations, they should not be considered infallible substitutes for common-sense sanitary measures against yeast and mold.

It is necessary that tanks be made of stainless steel and be glass-lined, or otherwise coated. Unprotected iron or steel should never be employed.

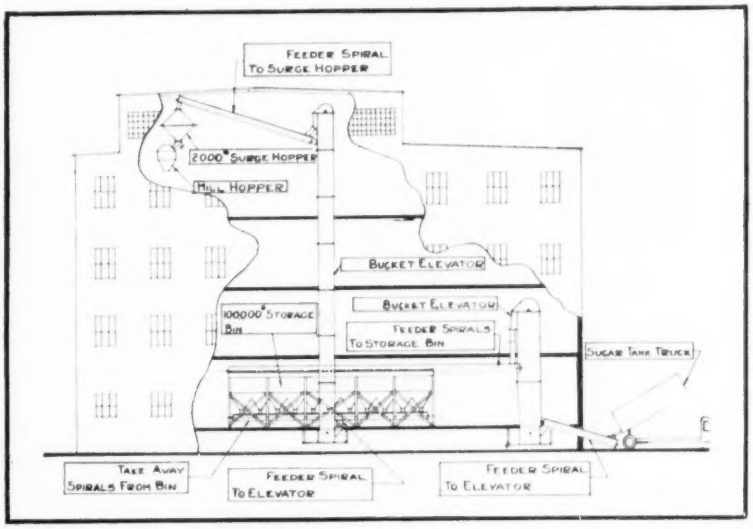
Located at bottom or on a side near the bottom, recommended syrup intake line is 3 in. Also piped from bottom location, discharge line should be 2 in.

Systems for Handling Granular

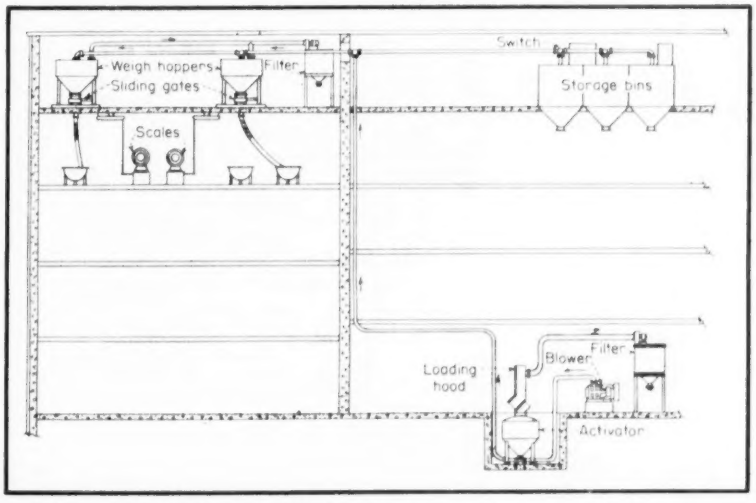
Justification for converting from bagged granulated to bulk depends in a measure on the number of stations in the plant where sugar is required and the distance they are apart. Unless the stations are few and close-


STAINLESS STEEL BOX
TANKS MILD STEEL 8'DIA. 8' SHELL DISHED HEADS LITHOLITE LINED 2200 GALLONS
IRON BODY ACF PLUG VALVES
POSITIVE DISPLACEMENT LIQUID SUGAR PUMP
BUCKET STRAINER
PLAN
OUTLET VALVE IN RISER
TO ADDITIONAL OUTLETS
AUTOSTOP TYPE LIQUID SUGAR METER
PRESSURE TANK PREFERABLY AT TOP OF RISER AND CLOSE TO END OF RUN
PRESSURETROL
METER BY PASS
LUCITE GAGE GLASS CLEANOUT GAGE COCKS
SCREENED HOOD
STERILAMP
CAP
DRAIN VALVE
BY PASS TO FILL LINE
CHECK VALVE
18 - 24 INSWING MANHOLE
ELEVATION
TYPICAL LIQUID SUGAR HANDLING SYSTEM

HANDLING SYSTEM using single pump to fill and empty liquid sugar tanks



PLANT LAYOUT for moving bulk sugar by screw conveyors and elevators.



TYPICAL PNEUMATIC installation for transporting granulated sugar.

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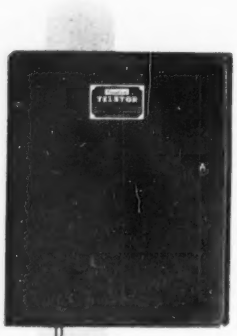
with precise yet sensibly priced instruments like this TELSTOR Electronic Level Indicator. TELSTOR measures continuously—with accuracies to ±2%—the levels of liquids, viscous fluids, powders or granular solids. Remote readings can be recorded at distances greater than one mile.



Fielden TELSTOR Electronic Level Indicator for Accurate, Continuous Level Measurement of Liquids or Divided Solids

Simplification is the reason for Fielden's economical instrumentation. TELSTOR, for example, has no moving parts—no floats to stick or leak—no pneumatic or hydraulic piping. Circuitry is simplicity itself and only one vacuum tube is employed. Measuring electrode and instrument are easily installed.

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by, handling equipment costs may prove excessive.

Use within the plant being sufficiently localized, the reception in bulk from nearby refineries may be in one of three general types of bulk containers.

Rail Cars, Truck, Bins

With a capacity of 80,000 to 100,000 lb., rail cars for bulk sugar are specially constructed (FE July '52, p. 78). They are divided into compartments each with sloping bottom to facilitate discharge. Insides of compartments are protective lined and each is hermetically sealed against dust or leakage. Usually cars are insulated to prevent inside sweating, with consequent caking, during transit.

These specially constructed units are usually owned by the user, though they may be leased on a rental basis from rail car suppliers. Availability of this type car, unless owned, is limited.

If the user's plant is within economical trucking distance of a refinery, deliveries may be via specially designed trailer-type, 22,000-lb. capacity stainless steel bin-trucks (FE June '51, p. 97), which are discharged at the plant by hydraulic tilting or by contained screw-conveyor arrangement. Like the rail cars, these bin trucks are sealed and usually insulated.

Emptying of rail cars is accomplished usually by one of two means. Contents of the compartments may be dumped into a pit between the

Meat Special Coming In September

NUMBER FOUR in the parade of 1953 FE Special Sections will appear in September.

This one will discuss important developments in the great meat field. And these developments are of significance not only to packers but to you people in the other branches of the food industry.

There will be a story about a basic new process for improving lard as a food ingredient. Another will give the details and benefits of a radically new way of performing the unit operation of smoking. A third will explain how to set up and operate an effective food-plant sanitation program. Then there will be articles on advanced packaging, efficient plant layout, and other contributions to progress.

The Meat Special will be a PLUS value. Regular articles helpful to readers in the various branches of the industry also will be published in the September number.

rails, where a screw conveyor then picks up the product for transporting to the plant handling system. Or an air-conveying system may be employed to move the sugar directly from the car.

Shipment in Small Bins

Considerable use has been made recently of the Tote Bin type shipping containers (FE Sept. '51, p. 83) with capacities between 2,000 to 4,000 lb. each. Some of these are owned by the user, some supplied by the refiner, some leased. Made of corrosion-resistant metals, they are hermetically sealed and sanitary. They are of a gross weight readily handled by fork or lift truck. Serving in the user's plant as mobile or portable storage, they are emptied as needed through a discharge gate at the bottom of one side by tilting on a specially designed rack.

When ceiling elevation permits, high-head storage bins, either round or flat sided, are used in the plant, otherwise generally squat, flat sided, pyramid-bottom bins are installed. Either type is usually filled by screw conveyor overhead and discharged into a screw for distribution in the plant (FE Oct. '52, p. 97). All bins should be covered and maintained dust-proof. They should be sufficiently tight to prevent moisture absorption, and sloped at the bottom no less than 45 deg. to the horizontal.

Both types may be constructed of galvanized sheet metal or of stainless steel. In uniformly warm locations, plain steel is suitable. Another construction alternative is a steel or cement structure lined with either maple or tempered Masonite. Insulation may or may not be required, depending on temperature conditions.

Selection of in-plant transporting equipment depends generally on volume of sugar to be handled, transportation distances, and processing requirements. Belt and screw conveyors, bucket elevators, drag-chain and flight-conveyors have been used satisfactorily, so also vibrators, pneumatic systems, and lorries. When metallic systems are installed, hot dipped steel or stainless are preferable. Tote Bins provide both a storage and transportation medium, since they are moved by truck.

In those cases where the process or the finished product require that the sugar crystals be maintained intact, belt or screw conveyors and bucket elevators should be selected, since their use results in minimum attrition, and also because power requirements are low.

If sugar dust fines are acceptable, some type of drag conveyor may be used, or a pneumatic system. When the latter is the choice, the conveying air should be filtered to prevent airborne contamination.

Though the precautions that need to be taken in dry sugar handling systems are few in number, nevertheless they are vitally important. Not the least is protection by insulation to prevent sweating, that is by caking of the sugar. Also necessary are safeguards against foreign-matter contamination.

Lost time and production interruptions may result if out-flow surfaces are not constructed at angles to the horizontal greater than sugar's angle of respose. Sugar arching and caking are sources of serious delays. And finally in air dispersal systems, safety measures must be taken to guard against building up sugar-dust potentials that can cause explosions.

The above article is based on a paper presented by the author before the New York Section of the Institute of Food Technologists.

LETTERS TO EDITOR

Bag-Form Quick Coffee Sold Years Ago

Editor, FOOD ENGINEERING:

The article on Jewel Tea Co. coffee bags (FE April, p. 75) has recently been called to my attention. Here it is implied that the bags put out by Jewel Tea are a brand new item and that U. S. Patent No. 2,224,942 was issued to Jewel Tea Co. on Dec. 17, 1940.

As a matter of record, U. S. Patent No. 2,224,942 was issued on Dec. 17, 1940, to Maurice Weisman, Roxbury, Mass., upon an application entered by him on Feb. 4, 1937.

As a matter of further record, the product described under that patent and apparently described in your article and called "Coffee Sealed Coffee" was marketed by Mr. Weisman through Seaman Brothers in New York many years ago.

. . . he voluntarily assigned his patents and began the development of our present Steepolator Coffee Bag. The Steepolator bag contains only 100 percent pure ground coffee . . .

Under the circumstances, you can understand why we must clearly establish the relationship between our present Steepolator Coffee Bag and the product that preceded it.—*Stanley H. Beaman, President, Modern Coffees, Inc., Boston 16, Mass.*

Air Pollution

—*Continued from page 63*

desired color. Approximately 1,200 cu. ft. of gas per hour is required for roasting. Effluent from the roasters at this point consists of volatile coffee oils and chaff (thin skin of the green

(*Turn page*)

They Do It The Easy Way

—*Continued from page 69*

This operation on flap facilitates placing of carton under filler. Now, as the flap is bent down it bears on one of two switch controls (3) attached to guide rail on both filler feed-conveyors.

Closing switch starts conveyor (4), which then slides a case onto the dead-plate. An empty case is delivered to operator only when previous carton is removed and its flap pressed against control. If case filling is interrupted on either or both lines, operator at case-diverting station, stops the empty case-feed conveyor coming from the unscrambler by operating a foot pedal-controlled switch (5). This temporarily halts feed of both jars and cases.

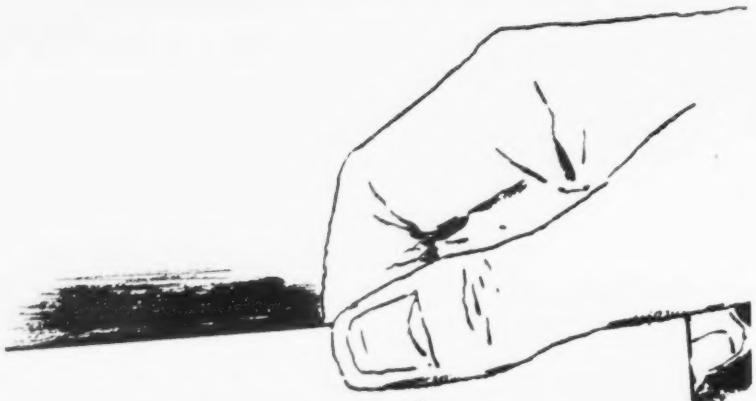
10. Template Assures Faultless Stacking

Cases in high palletized stacks are prevented from toppling, warehouse space is conserved, and case damage is minimized through the use of a two-compartment case-stacking template or jig. Also, hand palletizing is speeded, since proper stack alignment now requires neither time nor effort of operator, who merely slides cases against framework of template.

When stack on pallet is built to correct height, back side of template—(A) in left photo—is released from anchored position by lifting lock-bar (B), which fits snugly into a pipe-lined hole in the floor. Side is then pivoted 180 deg. on its hinges (C) to form a new right angled template with the permanently located side (D).

Swinging movable side away from completed stack permits access from the rear for a fork truck (see right photo) to lift pallet, remove it, and return with an empty. Meanwhile, accurately aligned stacking continues on pallet in second compartment.

End (*Resume reading on page 70*)



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"DOLCOURIN" ...a completely new flavor composition, is the result of the D&O Product Development Laboratories' concentrated efforts upon the Coumarin replacement problem. Non-alcoholic, high in fixative value, and approximately equal in flavor strength and tonal quality to Coumarin, "Dolcourin" is offered as a replacement suggestion to users of this material. "Dolcourin" contains no Coumarin or Coumarin derivatives whatsoever, and is suggested for use in any formula where Coumarin or Tonka are now employed as a complete or partial replacement. Tests have shown that the material blends well in Vanilla formulations and in many instances may even be preferred to Coumarin. Price $2.50 per pound, in 25 pound quantities.

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beans). Most of the chaff, however, is removed by separators, but a small portion does escape to add to the objectionable fumes. After roasting beans to the desired color, they are water-sprayed. Steam rising from the spraying operation adds to the exhaust, forming a carrier for noxious fumes.

Escape of the steam-chaff-coffee oil mixture to the atmosphere is prevented by the bed of 68 Oxycats on the roof of the plant. Gases leave the roaster at 175 to 325 deg. F. (depending on the phase of the roasting cycle). Then they rise through the exhaust stack to the catalyst installation.

Here, the gases are first preheated to 500 to 550 F. prior to entering the catalyst chamber. They are then burned while flowing across the alumina and platinum alloy coatings of the Oxycat rods.

Required to preheat the fumes is about 400 cu. ft. per hr. of gas to raise the temperature to 900 F. About 550 to 600 cu. ft. per hr. is needed for incineration by flame.

By improving the design of the installation, the manufacturer—Oxy-Catalyst, Inc., Wayne, Pa.—believes that gas consumption can be reduced to 300 cu. ft. per hr. Plans are also underway to recirculate heat from the preheater to the roaster.

Process was developed by Eugene J. Houdry, well-known pioneer in the catalytic cracking of petroleum.

End (Resume reading on page 64)

Continuous Mixing

—Continued from page 65

the new continuous methods for making butter and margarine, and in processes for quickly and continuously cooling shortening and vegetable oils, this kind of mixer is very important. It also finds applications in the bakery for mixing marshmallow and cake batters. Units described above are applicable for continuous mixing of many food products. But there are some operations that will probably always remain batch processes.

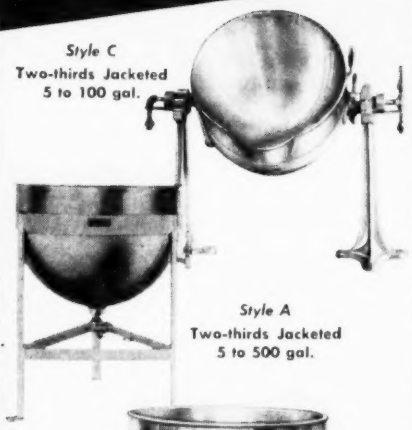
Perhaps the commonest reason for keeping batch operations is short runs in high varieties where change-over time and labor for a continuous system would be prohibitive.

We think it can be anticipated that one thing will go a long way toward nullifying this objection—the development of quick freezing techniques that will allow longer runs on each variety.

The above article is based on a talk, "Continuous Mixing in the Food Industry," given before N. Y. Section, Institute of Food Technologists.

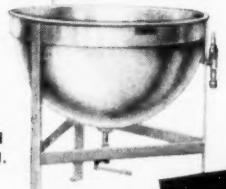
End (Resume reading on page 66)

COOKING KETTLES

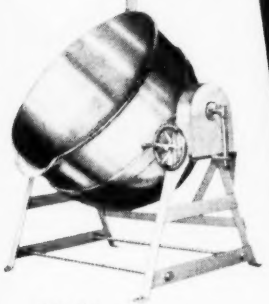


Style C
Two-thirds Jacketed
5 to 100 gal.

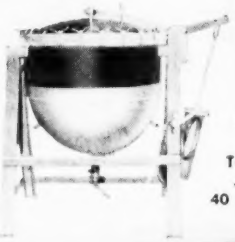
Style A
Two-thirds Jacketed
5 to 500 gal.



Style B
Full Jacketed
10 to 300 gal.

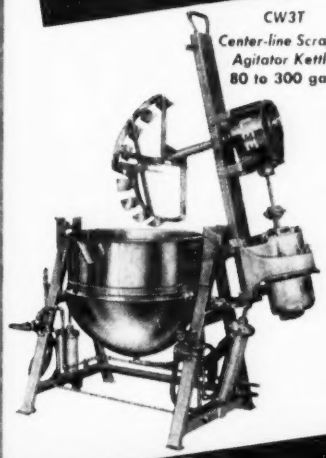


Style CW
Two-thirds Jacketed
80 to 300 gal.

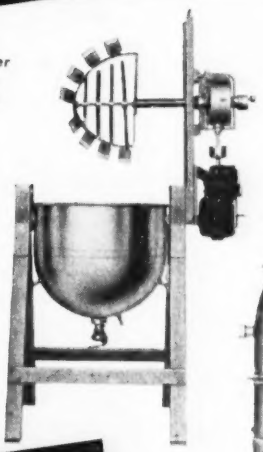


Pressure Kettle
Two-thirds Jacketed
40 to 200 gal.

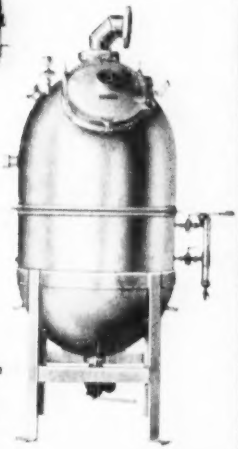
MIXING AND BLENDING UNITS



CW3T
Center-line Scraper Agitator Kettle
80 to 300 gal.



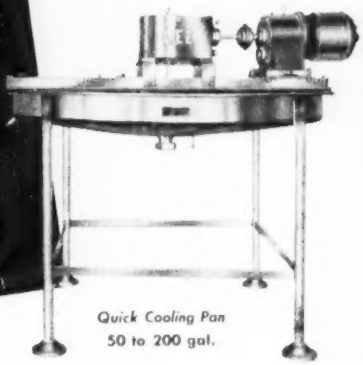
A3T
Center-line Scraper Agitator Kettle
25 to 300 gal.



Vacuum Pan
50 to
500 gal.

these LEE Units

WILL REDUCE YOUR PROCESSING COSTS!

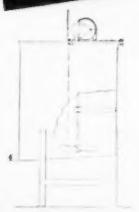


Quick Cooling Pan
50 to 200 gal.

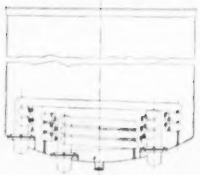
Individually designed for a specific processing operation and available in a wide range of sizes to fit your exacting requirements, Lee corrosion-resistant equipment is built to give you long years of peak performance with minimum maintenance.

Descriptive bulletins are available for any or all of the above units. Write for them today and discover how Lee can help reduce *your* processing costs.

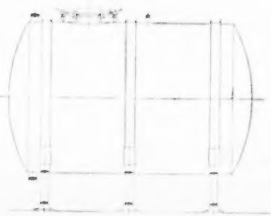
MIXING, COOKING & STORAGE TANKS



Mixing Tank
25 to 500 gal.



Pulp Tank
500 to 2,000 gal.



Storage Tank
100 to 5,000 gal.

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A fully automatic, high speed scale which will weigh, classify, sort and count your products into three separate channels, correct weight, over weight and underweight.

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- Saves labor — only the incorrect units require handling.
- Saves product normally given away in overweight units.
- Speeds production — weighs up to 100 units per minute.
- Eliminates inadvertent distribution of shortweight units.
- Removes human errors — accurate down to one gram on rejection.
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New Coating Process

—*Continued from page 94*

4. *Altering the chemical character of certain fugitive aldehydes and ketones to an entirely stable form, thereby permitting extended shelf-life without volatilization and subsequent loss of flavor quality or strength.* These products can be returned to their original state, at the time of ultimate preparation by addition of mildly acidulated water.

This method is excellent both in its stability and practicability, yet its application is limited because aldehydes and ketones represent only a small portion of the volatile materials found naturally in flavors.

5. *Emulsifying melted sorbitol with the flavor.* Upon crystallization, the mixture is formed into powders or ground to any desired screen size. Use of sorbitol has certain definite advantages in solving the problems of solubility. However, it appears to provide less protection from evaporation than some other methods.

How New Flavors Hold Up

Sealva flavors, which were developed to overcome the above objections, can be added to finished powdered products directly during processing, or they may be placed in separate containers to be mixed at time of use.

If amount of flavor to be added is very small, a pre-mix should be made with a portion of the powder in order to insure good distribution. And in case one of the ingredients of the mix is a liquid, the flavor should not be added until the liquid has been evenly distributed.

As to physical characteristics of the new flavors, they appear upon microscopic examination to be generally spherical in shape with a smooth, apparently hard surface (see lead photo). Although varying in size, 71 percent of the particles will pass through a 100-mesh screen.

Laboratory investigations appear to substantiate the claims for the imperviousness of the surface seal used in the new process. As is well known, citrus oils are extremely volatile and, when mixed with dry powders in the normal manner, quickly evaporate.

When pure lemon oil was mixed with a beverage powder and exposed overnight in an open container at room temperature (70 deg. F.), it was almost completely lost by evaporation. Only a slight odor of lemon waxes remained. No oil was recovered when the product was subjected to steam distillation. Similar results obtained with lime and orange oils.

The same amount of pure lemon

From OCEAN or ORCHARD...

Keep Your Packs Fresh with

Pfizer

Ascorbic Acid

● Keep your frozen food packs *looking* fresh and *tasting* fresh by adding Pfizer Ascorbic Acid.

For fish, Ascorbic Acid (alone or in combination with Citric Acid) prevents "rusting" of the fatty portion... preserves natural colors ... cuts atmospheric oxidation, source of rancidity and strong, unpleasant taste.

In fruits, Ascorbic Acid prevents oxidation, cause of browning and flavor loss. It adds to nature's own ascorbic acid which is not present in sufficient amounts to give adequate protection.

Write for Technical Bulletin No. 28 for helpful information on processing seafoods or for Pfizer's technical data on the use of Ascorbic Acid in fruit freezing.

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630 Flushing Ave., Brooklyn 6, N. Y.
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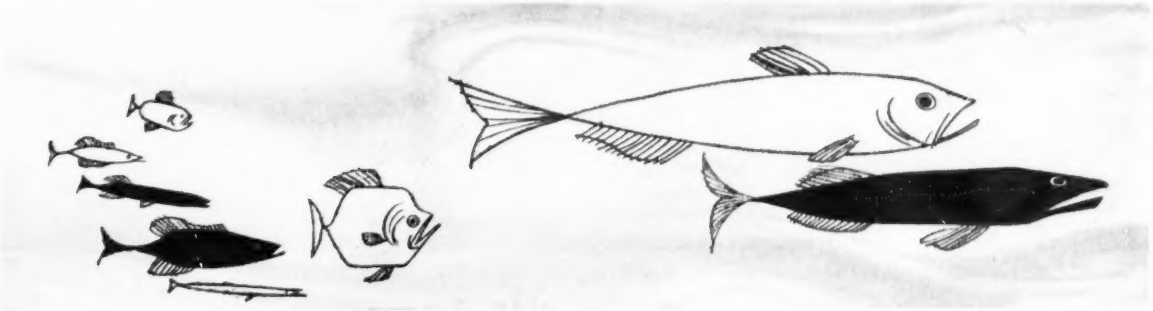

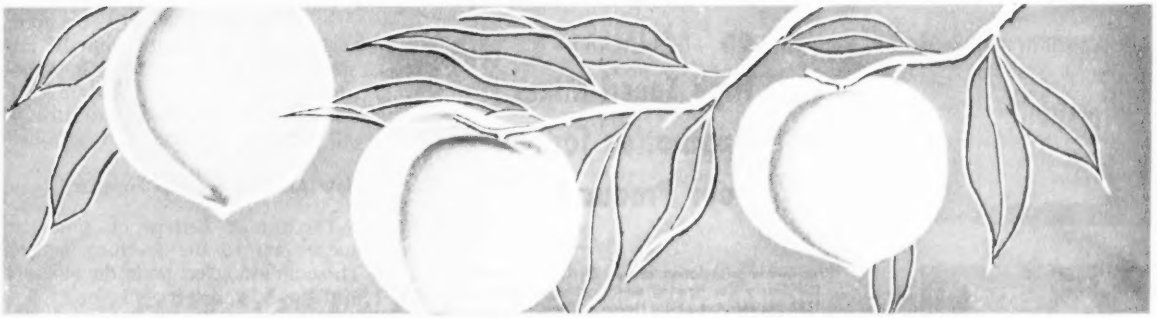

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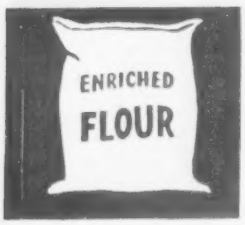
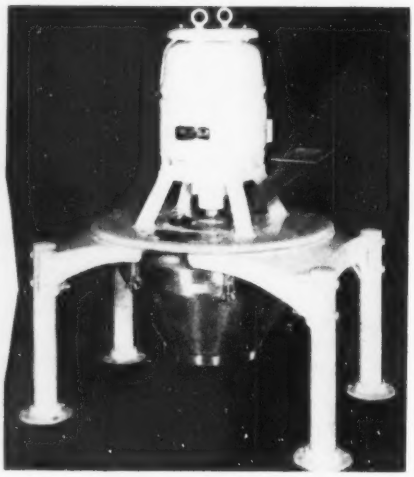
HIGH SPEED MIXERS



MAKE GOOD PRODUCTS *Better!*



Have You Considered an "ENTOLETER" High Speed Mixer Application for Your Product?

For further information, contact ENTOLETER DIVISION, The Safety Car Heating and Lighting Company, Inc., 1197 Dixwell Ave., New Haven 4, Conn.

ENTOLETER
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oil, which had first been entrapped by the Scalva process, was mixed with another sample of beverage powder and left in an open container at room temperature for a period of eight months. When subjected to steam distillation, 95.46 percent of the oil originally processed was recovered intact, thus indicating a loss of less than 5 percent by evaporation. Some of this same batch, after 15 months' aging, ran 92.47 percent.

A simple demonstration of the effectiveness of the new flavor sealing method is to compare the odor of the dry powder with that of the same powder after it has been dissolved in a glass of water. The dry sample emits but slight odor of the flavor, frequently to such a minor degree that identification is difficult. However, upon dropping a few grains of the material in water, an immediate release of strong identifiable odor is apparent.

End (Resume reading on page 95)

Versatile Licorice

Continued from page 83

in steam-jacketed evaporating kettles (300 gal. each). These are fitted with vertical-type agitators with scrapper blades that prevent the thick paste from sticking to sides of kettles.

In making the paste, liquor from the vacuum pans is concentrated to the desired final moisture level (12-25 percent.). Evaporation takes 4 to 8 hr. Paste goes directly into 26-lb.-capacity canvas-lined, wire-mesh baskets by operating a hand gate on the kettle-discharge pipe. Baskets are loaded 48 to a rack for 16 to 30 hr. of cooling. Solidified blocks of paste are removed from baskets, wrapped in moisture-resistant paper, and packed two blocks (52 lb.) to a carton.

In preparing the syrup, a 50-50 blend of invert sugar and liquor from vacuum pans is charged into the finishing kettles. The mixture is evaporated to a 30-32 percent moisture level. And the syrup is then filled into 20-gal. lacquer-lined steel drums.

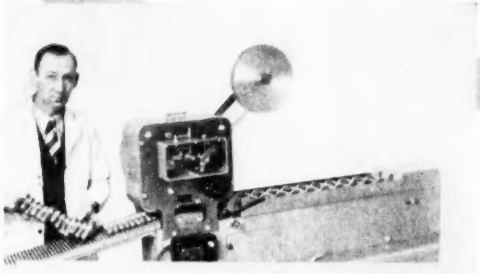
How Ammeters Help Finishers

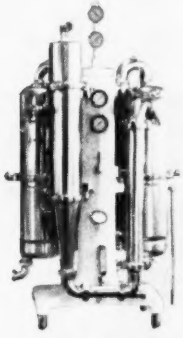
There is a battery of ammeters hooked up to the finishing kettles. These indicate changes in the viscosity of the paste during evaporation.

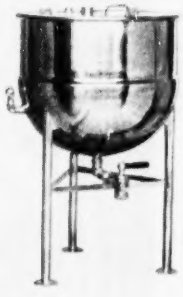
Thus, the operators have a better control over the quality of the paste being manufactured. Also, overloads on the motors are prevented through automatic cut-outs. In this way, motor burn-outs have been curbed, and accordingly downtime has been cut.

End (Resume reading on page 84)

Use This "Trick Done With Mirrors" to Protect Your Products and Your Profits







You may be processing food products . . . or manufacturing the equipment for someone else to do so, but in any case your problems are probably a matter of making a good product at a profit.

And that brings us to the "trick with mirrors". The trick is to always specify Carpenter Stainless Tubing for every requirement. You get the mirrors in the super-smooth I.D. of every length of every shipment. Thus you insure freedom from contamination . . . take a long stride toward a better product.

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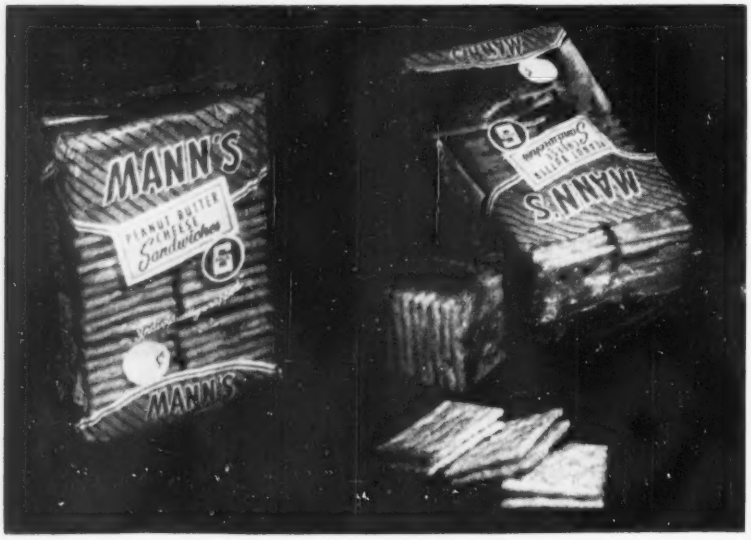
NEW PACKAGES & PRODUCTS

four individual bags, each holding 2 oz. of chips. Product visibility is assured by large transparent panels on opposite sides, Printed portion stresses "4 Inner Bags" feature.

For Package Data Use Reader Service, p. 157



Fractional Packaging Up in Popularity

A further high climb in the sphere of fractional packaging is noted in the recent surge to marketing of confectionery and crackers in inner-pack units.

Dobeckmun company's new colorful cellophane wrap for Mann Co.'s line of peanut butter-cheese cracker sandwiches. Wrapped first, four each, in amber cellophane, crackers are then packaged in a printed cellophane bag containing six of the smaller units. Printed in red, white, and blue, outer cover stresses individually wrapped 6-in-1 feature.

At the recent National Confectioner's Assn. convention, DuPont Film Dept. displayed many innovations in candy packaging. A printed cellophane bag holding three inner units of caramel-coated popcorn is hailed as providing double moisture protection. This advantage is brought to the attention of consumer by a printed band on the outer wrap. A circus clown's portrait on the label carries out the "circus popcorn" motif.

Handy Twin

A convenient carry-home unit made up of twin polyethylene bags, joined together by a cardboard handle, is designed for marshmallow packaging. Here, one sack is scribed "Let the kids munch on this bag after school", while the other reads, "Save this bag for toasting as a late evening snack."

Potato chips are ready for marketing in a printed cellophane sack containing

Wet-Strength Corn Bag

New Jersey sweet corn is now being shipped iced in wet-strength bags manufactured by Union Bag & Paper Corp. Carrying 52 ears of corn plus 20 lb. of ice, bags have a series of perforations that act as drains for the melted ice.

Previous experiments have shown that icing of the freshly harvested corn

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TRIPLE LAMINATE OF FOIL, POLYETHYLENE AND GLASSINE FOR VERY HIGH MOISTURE VAPOR PROTECTION. MADE, PRINTED AND COATED BY RIEGEL. CONTAINS 2 PACKAGES. EGG WHITE MIX IN GLASSINE/FOIL LAMINATE, HEAT SEAL POLYETHYLENE COATED. FLOUR MIX IN POLYETHYLENE COATED SPECIAL GLASSINE. BOTH CARRY PRINTED INSTRUCTIONS.

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Famous Pittsburgh firm uses FRICK Refrigeration

35 years, and finds it very dependable

The D. L. Clark Company, manufacturers of the world famous Clark Bar, and Clark Brothers Chewing Gum Company now operate eight large Frick refrigerating machines in their Pittsburgh Plants. The first of these compressors, installed in 1918, is still in service. Other Frick equipment includes condensers, coolers and controls.

Today, Clark Bars and Clark's Teaberry Gum are famous the world over. Frick air conditioning and cold storage systems play a vital part in maintaining the quality of all Clark products.

There's hardly a business that cannot profit from the use of similar Frick cooling equipment.

Let us quote on the system YOU need.

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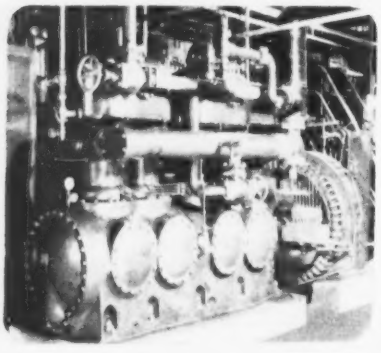
Frick 4 cylinder ammonia compressor at D. L. Clark Co., Pittsburgh. Motor has 300 hp.



kept sugar in the corn from turning to starch while enroute from farm.

Corn packaging and icing operations are mechanized, bags being stored in refrigeration until shipment.

For Package Data Use Reader Service, p. 157

Heat-Conditioned Chocolate

Idis Chocolate Co., Brooklyn, N. Y., is packaging a new candy product in a colorful carton designed and made by Robert Gair Co.'s Eastern States Carton Div. The product, a block type malted crunch, is packed 24 to a carton and is warranted to withstand the most adverse summer conditions states maker.

Printed in red and brown, carton shows a child eating the product and a cross section of the malted crunch. The carton's top panel folds back to make a bright display.

For Package Data Use Reader Service, p. 157

3 New "Flexibles" Offered

Of interest to processors using flexible packaging materials are three new types. All low cost and highly protective. One is a two-ply sheet for wrapping chewing gum of high gloss (outside) glassine laminated to a thin gage foil.

Second is a protective sheet used as a pouch for dried soup mixes and similar items. It consists of laminated polyethylene, foil, and kraft paper.

Third sheet is currently being employed for two unit packages—flour and egg white mixes—that make up an angel food item. This low cost sheet of glassine and foil laminated with polyethylene on the inside is reverse-printed on the outside to avoid scuffing for packaging the egg-white mix. For the flour mix, a glassine-polyethylene sheet is used, with "poly" on the inside. Riegel Paper Corp., New York City, is maker.

Appetite Appeal in New Label

A new version of the H. J. Heinz Co.'s label is being used on the company's baked bean line. The famous Heinz trademark—the keystone symbol imprinted with "Heinz" and "57"—is still in evidence in an upper corner of the label. This positioning allows space for more appetite appeal. Back panel contains suggestion for preparation and side panels list ingredients.

A brown crockery bean pot filled with beans is featured on all of the baked bean cans, making the can appear larger as well as spurring impulse buying. Each variety of beans is identified by a color: Green background with a dark blue band for vegetarian beans in tomato sauce; light blue background with dark blue band for beans with pork and tomato sauce; white background with red band for New England style beans; and yellow with blue band for Boston style beans.

Jim Nash, industrial designer, was called in by Heinz as consultant designer.

Strained Egg Yolk Product

Swift & Co.'s new strained egg yolk for babies is being marketed nationally in the same 3½ oz. can used for the company's line of strained meats. Each can contains equivalent of 3¼ egg yolks in a product rich in iron and protein, and is laboratory tested for complete purity.

Product is reported completely sterile and shelf-stable.

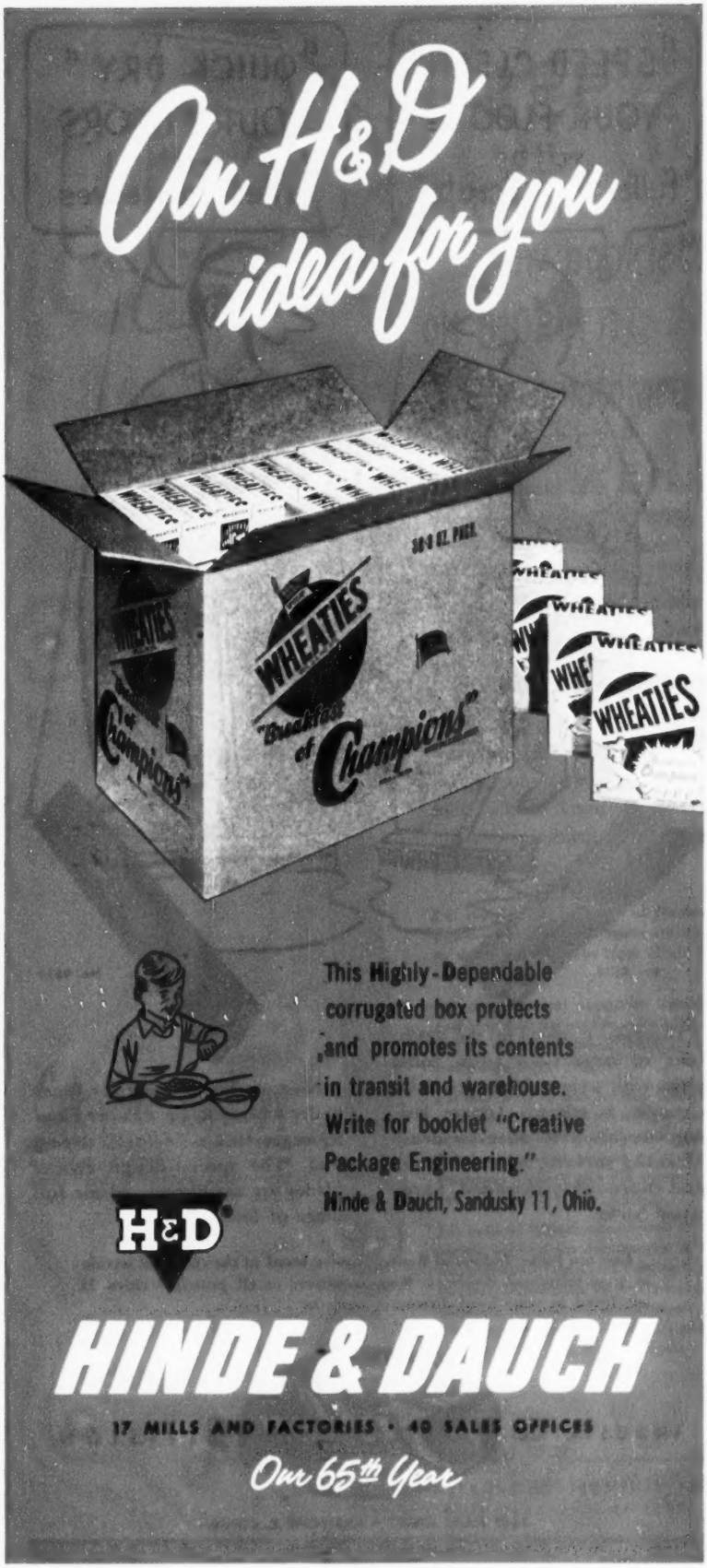
"Poly" Pickle Pouch

Heckman Products Corp., Washington, D. C., is currently marketing its line of dill pickles in transparent film pouches. Two pickles are packed in each three-color pouch.

Pouch is fabricated from lamination of cellophane and polyethlene. Designed by Shellmar Products Corp., Mount Vernon, Ohio, package features Heckman name, description of pickles, and price spot on front, leaving back unprinted for complete product visibility.

The pouches are fabricated from laminated roll stock with cellophane reverse-printed in Shellmar's Colodense process before lamination to the extruded Shellene. Both kosher style and process pickles are packed in the pouch, differentiating only in the label print.

For Package Data Use Reader Service, p. 157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Write for booklet "Creative Package Engineering."
Hinde & Dauch, Sandusky 11, Ohio.
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Designed to speed up the scrubbing of large floor areas. Some types with wide end flare for easier cleaning in corners. Longer lasting, too, because of extra-dense cleaning surface, selected fibers and thoroughly-seasoned, hardwood backs.

No time lost waiting for floors to dry when you use a Fuller Floor Squeegee. It's a "4-in-1" drying tool. The special-design rubber blades are easily reversed for full usage of four edges.

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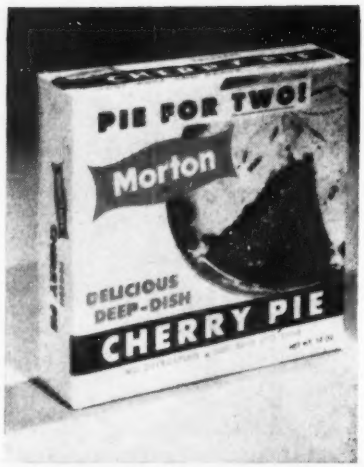
Power Driven Brushes, Factory & Institutional cleaning tools, Waxes & Detergents



Frozen Deep-Dish Pies

Already well known for its line of frozen meat pies, Morton Packing Co., Louisville, Ky., has introduced a "bake and serve" line of deep dish apple and cherry pies.

Each 10-oz. pie is enough for two servings, and requires only 30 min. in the consumer's oven to brown. Feature of pies is that they contain virtually no starch. Each pie nestles in aluminum foil and is packed in an overwrapped chipboard carton. Full color label illustrating contents is designed to spur impulse buying.

Strawberries in Large Tins

A new "queen-size" tin container holding 16 oz. of frozen strawberries and designed to serve three or four people will be packed by Snow Crop Div. of Clinton Foods, Inc., New York City.

The large container is designed to answer consumer demand for an average family-size portion. Secondary reason was merchandising display value and ease in home handling.

Higher Volume

—Continued from page 88

oughly blended, it is filled into 55-gal. steel drums lined with 4 mil polyetheylene bags. Prior to filling, an inert gas is introduced into the bag to displace air and retard surface oxidation during storage periods. The concentrate is stored in a 36-F. refrigerated room.

Squirt Base Manufacture

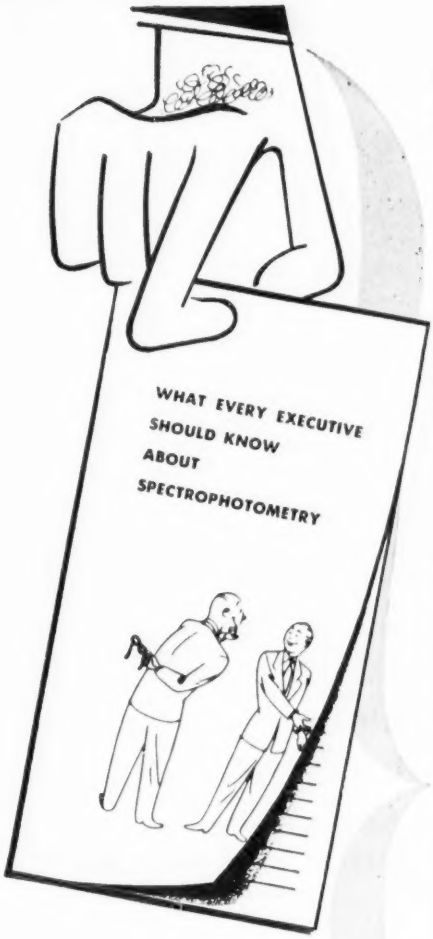
Quality of the finished base has been predetermined by the quality and character of the fresh fruit and the care given in processing the juice and essential oil of grapefruit. Squirt base is blended throughout the year from concentrate made during a relatively short growing season when fresh, good quality grapefruit is available. Amount of concentrate used is determined by its juice equivalent, which results in a uniform content of grapefruit juice and flavor in the beverage reaching the consumer.

To maintain uniform flavor and quality, concentrate used for blending each batch of base is especially selected to obtain a representative cross section of each period of the crop season. During the first period of harvest, sugar and acid contents of the juice are high and the flavor is pungent. As the season advances, from early to late spring, sugar and acid contents gradually decrease and the flavor mellows. Area from which the fruit comes also varies its sugar and acid contents, as well as flavor. During the present year, selection for blending will be made from juice extracted from approximately 17,000 tons of fruit.

The cold, concentrated juice is pumped from drums into 800-gal. blending tanks. Pure oil of grapefruit is homogenized into the concentrate, a predetermined quantity of citric acid is mixed into the batch, and sufficient water is added for standardization. To avoid deterioration, heat is not used during blending. Care is exercised to maintain sterility of the batch.

After standardization, the base is pumped over a glass inspection plate, lighted from beneath, where inspectors use suction tubes to remove undesirable material, such as immature seeds, coarse pulp, or specks. The batch, still below 50 F., is filled into gallon jugs on a straight line vacuum filler. After capping, these are cased and again chilled to 35 F. prior to shipment.

Chilled base is shipped by refrigerator cars to twelve centrally located



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This helpful new booklet on modern Spectrophotometry

By means of a great new science—Spectrophotometry—laborious, time-wasting analytical procedures are rapidly being replaced with faster, simpler methods of chemical analysis and control.

This booklet, complete with color charts and illustrations, provides for the first time a basic summary of the important facts to know about the interesting subject of Spectrophotometry . . .

- It explains the principles of Spectrophotometry—how light beams are used to simplify the various types of chemical analyses.
- It shows typical absorption spectra and how they are used to quickly identify the individual chemicals and chemical compounds.
- It tells what to look for in a Spectrophotometer *and why* . . . the importance of adjustable band widths—wide wavelength range—and how to be sure of maximum versatility in the equipment you select.
- It outlines typical money- and time-saving applications for modern Spectrophotometric equipment, ranging from medical laboratories to bottle-making machines . . . synthetic rubber plants to food processing operations . . . paint making to criminal investigations.

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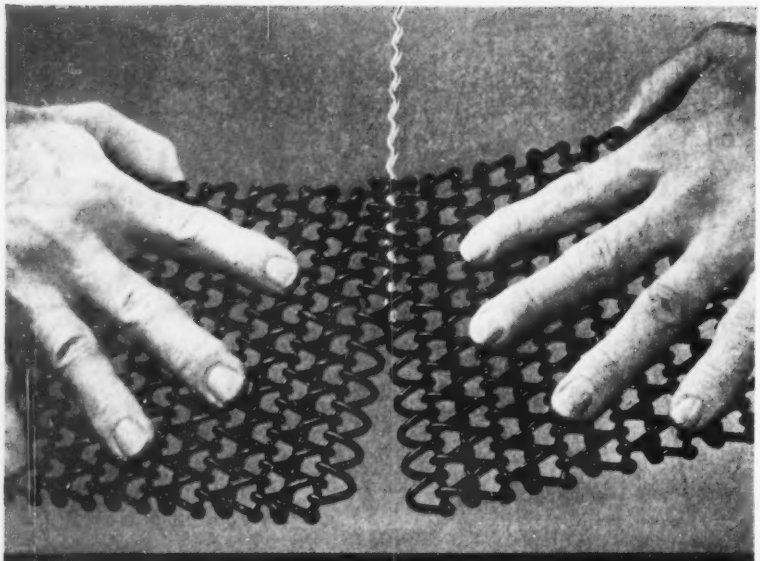

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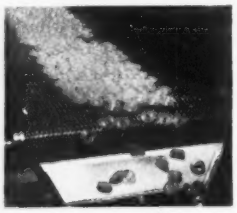
best for food plants!

No seams to tear! No lacers to wear! No fasteners to cut the belt! The ends of Cambridge wire mesh conveyor belts are joined the same way the belt is made. Thus, there is no seam or weakness where the ends are joined.

That's just one reason why Cambridge WIRE MESH conveyor belts are superior to solid types of belting for food processing. Open mesh of the belt allows free circulation of heat or cold for cooking or cooling. Wash water, cooking oils or other process solutions drain freely through the openings in the mesh. The all-metal belt has no odors, thus cannot contaminate the natural flavor or aroma of your product. Stainless steel construction provides further freedom from contamination by giving life-long rust protection. All-metal construction also gives long life.

No matter how you look at it, the best all-around conveyor belting for food processing is WIRE MESH . . . and the best wire mesh belts are made by Cambridge, pioneers in wire mesh belt fabrication. Cambridge belts are made in any size, mesh or weave, any metal or alloy. Your Cambridge Field Engineer can recommend the best type for your plant. Look under "Belting—Mechanical" in your classified phone book for the Cambridge man nearest you . . . or write direct.

COOLING CANDY
Air circulates freely through open mesh of belt to cool these candies quickly. Moving belt speeds production, carries constant stream of candies to subsequent stations.



FREE BELT MANUAL
illustrates and describes wire mesh belts, gives belt specifications, conveyor design data, metallurgical tables, other useful information. Write for your copy.

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OFFICES IN PRINCIPAL INDUSTRIAL CITIES

cold-storage warehouses for distribution to bottlers. In transit, its temperature may rise as high as 50 F. But it is again chilled and stored at 35 F. until it is shipped from these intermediate storage points to the more than 300 franchised bottlers. From the time the concentrated juice is taken from the vacuum evaporator until the finished product leaves these intermediate warehouses, it is refrigerated. Low temperature insures its quality until it is converted into beverage. Bottlers, who store a stock of Squirt base, also refrigerate it to protect quality.

Laboratory Control

The Squirt Co. laboratory is equipped for carrying out four major functions and duties—all directed toward the goal of producing a standard quality beverage.

First function of the laboratory is that of quality control, which starts with the fresh grapefruit as it arrives at the processing plant. Sample fruit from each load is hand reamed to determine juice content. Brix and acid content, flavor, color, and other quality characteristics are recorded.

During extraction, finishing, and pasteurization, the juice is continuously sampled. A composite sample is taken of each 600 gal. delivered to the vacuum evaporator, when, once again, Brix and acid determinations are made, pulp content determined, and color, flavor, and other characteristics affecting quality, are noted. After concentration, samples of each batch, representing approximately 800 gal. of concentrated juice, are analyzed for the same factors. Concentrate is also plated on nutrient agar and a special malt extract agar for determination of bacteria, yeast, and mold. Because the juice has been pasteurized, microorganisms are rarely found.

By using Brix and acid determinations of both juice and concentrate, juice content equivalent of each gallon of concentrate is determined.

Brix, acid, and juice content records are made of each drum of concentrate. Each lot of base is calculated from these records prior to blending, making possible uniform standardization of product. Concentrate is selected from several batches to give desired juice content as well as solid, acid, and pulp contents. These characteristics vary during the season, as does the flavor and color of the grapefruit juice. After compounding the base, and just prior to bottling, a preliminary standardizing analysis is made. If needed, additional small quantities of ingredients, such as citric acid, are added to bring the product up to standard.

After bottling, representative gal-

lon jugs are taken from the line and final analytical tests are made to assure that all factors are up to standard. At this point, a thorough analysis is made, including: Citric acid content, solids content, reducing-sugar content, color, and pulp. A sample beverage is made to check flavor and other analytical and constant factors. Finally, the base is plated and checked to be certain it is free from microorganisms. Any batch that does not meet standards is either discarded or set aside and not shipped until difficiencies are corrected.

Second function of the laboratory concerns uniformity of Squirt beverage as produced by bottlers. Samples are sent regularly to the laboratory for analysis, and reports are made to bottlers where improvement is deemed necessary.

Since water is the ingredient added in greatest quantity to make the beverage, it is of utmost importance. Regular analyses are made of water samples sent in by bottlers. Additional samples representing a cross section of finished product in each market area are purchased both by Western Union messengers and company representatives in the field. These are given the same analyses as those received from the bottlers. Recommendations may be made from these in regard to improving distribution and display practices, which also affect beverage quality.

Research and Development

Third function of the laboratory is research and development directed toward product and process improvement. Small-scale pilot-type plant equipment includes: 1. A Precision evaporator equipped with a special low temperature condensing system equipped with a Welch high-vacuum pump. This is used for experimentation and research work on citrus juices, citrus oils, and citrus byproducts. With this unit citrus juices can be evaporated at temperatures lower than 40 F. 2. A Sharples laboratory model super-centrifuge for research in production of essential oils. 3. A Manton Gaulin 2-stage laboratory-model homogenizer for compounding special small batches of base used for investigations. 4. Small-sized mixing equipment for work under vacuum or pressure, hot or cold temperatures, and with or without agitation. A Beckman spectrophotometer has been added for use in research and control problems.

Fourth function of the laboratory is to translate the results of research into plant practices, some of which require the special engineering of equipment and materials.

End (Resume reading on page 89)

It imprints

with dates, code nos., etc.

your labels

for food, drug products, etc.

and counts

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accurately

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Feeds and stacks automatically... records full and part runs on visible registers . . . So much faster than ordinary imprinting that it shows truly *big* savings in time and manufacturing costs... Used by production and packaging executives in hundreds of food and drug plants and wholesale houses... So accurate, banks use it to count currency! For a demonstration, or the free illustrated booklet, call the nearest Pitney-Bowes office, or send coupon.

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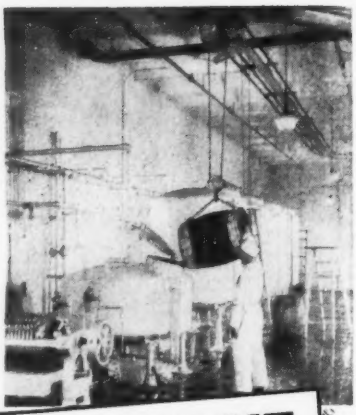
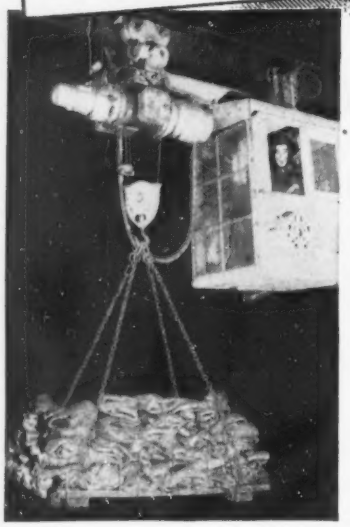
SHEPARD NILES
Floor-Operated Hoist

Operator mainly occupied with other duties. Hoist used for fast, efficient handling of relatively short hauls.



WHICH HOIST is RIGHT FOR YOUR JOB?



SHEPARD NILES
Cab-Operated Hoist

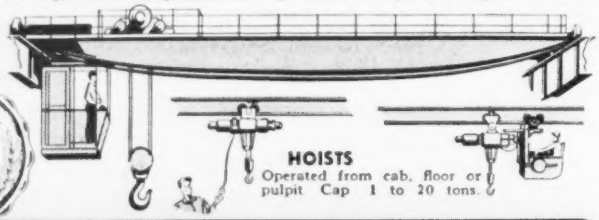
Operator in cab moves loads along at high speeds—occupies best vantage point for spotting or stacking materials.

Choosing the hoist that's right for your job calls for expert advice.

Let the Shepard Niles representative in your area guide you in your choice. He specializes in through-the-air handling—can help you select the hoist that best fits your job. Write Shepard Niles today for latest bulletins describing both types of hoists—and ask to have a representative stop by your office.

CRANES

Overhead: Top running, inner running, under running, floor or cab operated. Cap: 1 to 450 tons.



50th ANNIVERSARY — SHEPARD NILES CRANE & HOIST CORP. — 1903-1953

HOISTS

Operated from cab, floor or pulpit. Cap: 1 to 20 tons.

SHEPARD NILES
CRANE AND HOIST CORPORATION

1223 SCHUYLER AVENUE, MONTOUR FALLS, N.Y.

9 Legal Tipoffs

—Continued from page 98

originally advanced sum of money—that is, the $4,000.

The grower had sued for full value of the balance of the crop. And deciding in favor of the grower, the higher court held that, irrespective of the clause limiting buyer's damage liability to $4,000, the grower could recover from the buyer his full damages, less the advanced $4,000.

The court said: "The defendant (the buyer) failed voluntarily to fulfill his contract by picking all the marketable fruit and elected to treat the $4,000 deposit as an advance payment for the last fruit picked by him. He will not now be heard to say that the deposit was an agreement for liquidated damages. The judgment should have been in the full amount of actual damages sustained, less the sum of $4,000 which was the amount of the deposit held by the grower."

Thus the law is presently established that, despite the fact that a contract contains a specified amount as "liquidated" damages payable to a grower, if the buyer breaches his contract, the grower always may recover from the buyer full damages. If the buyer has advanced the grower any money, this sum is deductible from the amount payable to the grower as damages.

How Safe Are Trademarks?

Q—Please comment on validity of trademarks and damages that may be obtained if they are infringed.

A—A validated trademark does give protection, and one who infringes it may be liable in damages, plus additional damages for "unfair competition."

In *Pastificio Spiga v. De Martini Macaroni* (200 Fed. 2d, 325), it was revealed that a company had registered in the Patent Office the trademark "S.P.I.G.A." The word "spiga" means "head of the wheat". Use of the trademark was on macaroni and spaghetti made and sold by the company.

Later, a person named White began offering the same type of food products under the trademark "Spigadoro." Legal action followed, and the higher court ordered White to stop using his trademark, saying:

"It seems clear that the plaintiff has proved an infringement of his valid trademark and is entitled to an injunction restraining the defendant

Doesn't Your Business DESERVE the BEST in Sanitizing Agents?

The ORIGINAL Quaternary Ammonium Germicide

Laboratory tested and controlled
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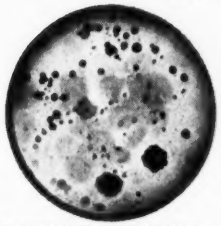
SANITIZING AGENT

to do a more effective sanitizing job throughout your plant!



Petri dish showing colonies of bacteria before the use of ROCCAL.

Petri dish showing no bacterial growth after the use of ROCCAL.

In the Food Industry, the importance of using only the best in sanitizing methods cannot be over-emphasized.

In Roccal, the *original* quaternary ammonium germicide, the food industry is offered a sanitizing agent that is laboratory controlled and tested. The uniform quality of Roccal means uniformly good results in doing a proper sanitizing job.

Roccal is a powerful germicide. In recommended dilutions, it is non-poisonous, non-irritating to the skin, virtually odorless and tasteless.

Roccal can be used for every sanitizing job in processing and packaging in the following food industries: milk, cream, ice cream, butter, cheese, egg breaking, sugar, fish, poultry, fresh frozen vegetables and fruits, meat products, cereal products, candy and beverage, wherever the product comes in contact with equipment. Also to keep walls and floors sanitary.

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Our Technical Service Department stands ready at all times to answer your questions about specific uses for ROCCAL

START USING ROCCAL TODAY—
you'll find that better sanitation is good business.

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YOU'LL WANT TO KNOW HOW THE CAMPBELL WRAPPER
Cuts packaging costs—
...Speeds product production!
We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments.
CHEDDAR CHEESE
POND'S TISSUES

VARIETY? . . . There's little limit to the type and kind of miscellaneous products package-wrapped on the versatile CAMPBELL Wrapper. This modern machine wraps with all the latest packaging materials including films, foils and polyethelene and heat or glue seals for best product protection. Completely wrapped packages are delivered at amazing speeds of *80 to 300 units per minute*—dependent upon product but, including *single or multiple* products per package. The CAMPBELL Wrapper effects full scale labor savings too, for in many cases a single operator tends several machines at one time! Further savings are also effected in material usage, for trays or stiffeners need only be used, *if desired*. Various type feeders as well as code daters, strip openers, etc. available. No matter what your products may be—get full details on this modern method of package wrapping them today!

The perfect wrapper for:

- CANDIES AND CONFECTIONS
- FOODS AND BAKERY PRODUCTS
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(White) from further acts of infringement."

Also, the testimony showed that White imitated the company's wrappers and packages. In this respect the higher court held White guilty of unfair competition and thus liable for damages. The court said:

"There was some proof of both trademark infringement and unfair competition in the copying of the plaintiff's wrapper. For this the plaintiff would be entitled to recover damages if the defendant (White) intended to benefit from the plaintiff's reputation."

The court also said that as a measure of damage the plaintiff could prove that White realized profits which the company would have received if allowed to sell its products without interference.

Further, the court held that the plaintiff could recover additional damages if it proved there was injury to its reputation through sales by White of a food product inferior to that which the plaintiff marketed.

What of Toys Adulterating Food?

Q—Is food "adulterated" when toys, trinkets, etc., are packed in with it?

A—According to the decision in *Cavalier Vending Corp. v. United States* (190 Fed. 386) the answer is no. Here, Federal agents charged that Cavalier violated the provision of the Food, Drug & Cosmetic Act that food "shall be deemed adulterated" if it contains any poisonous or deleterious substance which may render it injurious to health.

Cavalier was operating slot machines that delivered candy and chewing gum along with one or more plastic or metal trinkets. The higher court found no violation.

Injured by Eating—Who's Liable?

Q—Where does the liability lie when a person is injured by eating food he obtains in a package?

A—A higher court has decided that under the law there is an implied warranty to the consumer that purveyed food is free from foreign substances.

In *Bow Biscuit Co. v. Hines* (240 S.W., 2d, 467), it was testified that a customer named Hines bought at a retail grocery store a cellophane bag of cookies manufactured, packaged, sealed, and sold by Bow. In eating the cookies, Hines swallowed a thin wire and was severely injured.

Hines sued both manufacturer and retailer for heavy damages. The court

held that retailer, wholesaler, and manufacturer all are liable on an implied warranty that the food they sell is fit for human consumption.

Also, in *Griggs Canning Co. v. Josey* (164 S.W. 2d, 835) the Supreme Court decided that the retailer was liable under an implied warranty, even though the food was in sealed containers and thus the retailer had no means of knowing its condition.

End *(Resume reading on page 99)*

New Fungicide

—*Continued from page 127*

a natural component of butterfat.

Results of rat feeding tests conducted by Drs. C. S. Weil and H. F. Smyth of Mellon Institute have indicated that at extremely high consumption levels sorbic acid is harmless. Drs. H. J. Deuel, Jr., and R. Alfin-Slater of University of Southern California not only confirmed the above findings, but also demonstrated that, in the body, sorbic and capronic acids are indistinguishable. Both are readily utilized as sources of calories.

Dr. D. Melnick and associates at Best Foods developed an analytical technique for determining sorbic acid in wrapping materials and in cheese products. With these methods it was shown that sorbic acid migrates rapidly from wrapper to surface of cheese, thereby protecting the product from mold spoilage.

The above findings were reviewed by the Pharmacology Section, FDA, which ruled that use of sorbic acid as a mold inhibitor for cheese was safe.

Accordingly, cheese manufacturers have filed applications for temporary permits allowing use of sorbic acid-treated wrappers. These permits would give cheese makers an opportunity to confirm, on the basis of actual experience, results of tests conducted both in the laboratory and on a commercial scale.

If it's found that sorbic acid performs to their satisfaction on a large scale, standards of identity for cheese products will be reviewed at a formal hearing, with the object of including it as an optional ingredient.

While it is an effective fungistatic agent, sorbic acid cannot be expected to replace good sanitary practices.

Sorbic acid is now available in quantity from Carbide & Carbon Chemicals Co.

The above article is based on papers presented at the 13th Annual Meeting of the Institute of Food Technologists, June 24, 1953.

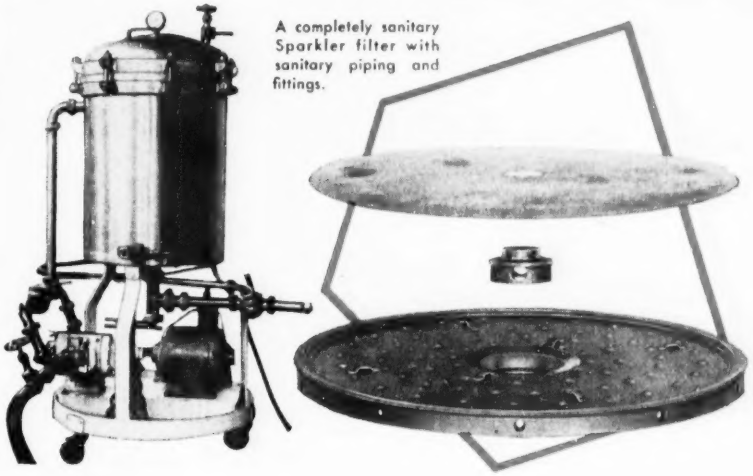
End

COMPLETE SANITATION

is a feature of the special sanitary

SPARKLER FILTER

of particular interest to food processors



A completely sanitary Sparkler filter with sanitary piping and fittings.

You can see at a glance why Sparkler filter plates are the most sanitary plates ever designed.

All surfaces, inside and out, are easily accessible for thorough cleaning. The top screen that supports the filter paper, a center separator, and the bottom plate is all there is to it. These parts can be separated without unscrewing bolts or nuts. The tie rods of the complete plate assembly holds the plate parts firmly together without danger of bypassing.

With most other types of filter plates the inner surfaces are inaccessible and cannot be cleaned; contaminating food particles are locked in and the first run of a new batch frequently must be discarded or rerun through the filter to obtain a pure product.

With Sparkler sanitary plates, a pure product is obtained right from the start, and continues pure with fine sharp filtration to the end of the filtering cycle.

Sparkler filter plates can be removed for cleaning in one unit and a fresh thoroughly clean set lowered into the filter tank. This reduces down time to a matter of minutes.

Sparkler filters are available in stainless steel, monel, nickel, bronze, or Hastelloy, steam or brine jacketed. Available in a range of capacities up to 10,000 G.P.H.

They are efficient in filtering all food products such as:—

Candy Scrap	Liquors	Lard
Chicken Broth	Milk	Deep Frying Fats
Cider	Molasses	Beet Sugar Syrup
Egg Albumen	Syrups	Beer
Extracts	Vinegar	Wines
Flavors	Fruit Juices	Whiskies
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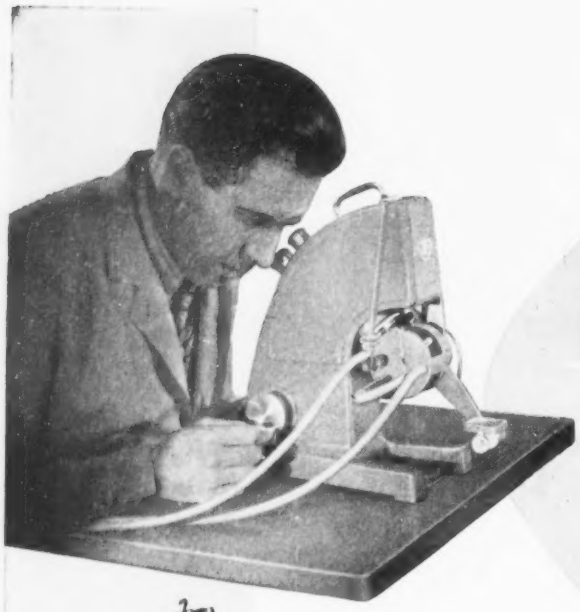
For personal service on your filtration problems Write . . . Mr. Eric Anderson

For more information, use coupon on page 157.



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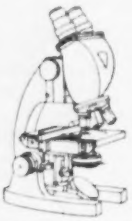

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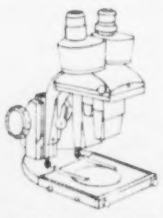

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ADVANCES IN TECHNOLOGY

Addition of Dried Whey to Low-Sugar Formulas Improves Chacteristics of Yellow Cakes

Tenderness, texture and keeping quality of low-sugar formula cakes is greatly improved by addition of dried whey. And this improvement is greater than can be accounted for by the increase in sugars resulting from this addition.

A study was undertaken to compare effects of added dried whey or various sugars to a basic cake formula containing 100 percent sucrose. Sugars used were sucrose, glucose, alpha and beta lactose. They were added at two levels—15 and 30 percent. Level of dried whey was 20 percent of weight of flour.

Panel scores for cakes from basic mix and those with 30 percent added sugars, at 24 and 72-hr. after baking, showed that all containing added sugars had greater volume. Sucrose and beta lactose gave cakes of greatest volume that were light and porous and coarse grained.

Greater compressibility and an improvement in texture and tenderness were also apparent in cakes with 30 percent added sugars. Those containing added glucose, alpha or beta lactose received the most favorable comments. Basic formula and added sucrose cakes were criticized for dryness.

Addition of 15 percent sugars produced results that were similar, yet not so pronounced as the larger amounts. Cakes containing 20 percent dried whey were slightly lower in volume than controls, but compressibility compared favorably with those having added sugars.

Crust colors ranged from pale in cakes containing only sucrose, to golden brown with added lactose and dried whey, to dark brown with glucose.

Cakes containing whey received the greatest number of favorable comments from judges and the highest numercial scores after 24 and 72 hr.

Therefore it was concluded that addition of dried whey to the basic formula results in a significant improvement in quality of cakes.

Digest from "Effect of Dried Whey and Various Sugars on the Quality of Yellow Cakes Containing 100 Percent Sucrose," by J. de Goumois and F. Hanning, *Cereal Chemistry*, 258-67, May 1953.

Insecticide Treated Bags Contaminate the Contents

Storage of flour and cereal foods in insecticide treated bags involves contamination of contents as well as prevention of infestation.

Jute bags, Hessian type weave, were impregnated with 1.0-1.5 percent DDT and 0.1 percent BHC (benzene hexachloride) which was sufficient to kill grain weevils in contact with the bags in 48 hr. Bags were filled with 85 percent extraction flour, and closed by rolling the tops and sewing them with jute twine.

Flour was stored for 6 months at 72-85 F. and 73 percent relative humidity. Brown spider beetles, Mediterranean flour moths, and confused flour beetles used as test insects, were liberated in storage space after 14 days and 90 days.

DDT above 1 percent was found to be effective against the spider beetle and the flour moth, but not against the confused flour beetle. BHC at 0.1 percent did not afford much protection against any of the insects. Contamination of flour amounted to 4.2 ppm. BHC and 13.8-23.0 ppm. DDT, all over current tolerances for these insecticides in foods.

Baking tests made on flour after 12 days of storage indicated that its baking qualities were unimpaired, but that a moldy taint carried over from the flour in the BHC treated bags. Some tasters recognized a bitter taste in bread from flour in the DDT-treated bags.

Digest from "The Storage of Flour in Jute Bags Treated With Insecticides," by W. G. Atkins and E. N. Greer, *The Journal of the Science of Food & Agriculture*, 155-60, March 1953.

Natural Bread Softeners

Two fractions of soy flour have been found equal to chemical softeners in decreasing the firmness of bread crumb.

They are "gelsoy" a water soluble part obtained after washing the flour with alcohol, and soybean whey solids, which are normally waste products of soybean protein manufacture.

In addition to being good bread-softeners when added at 1 percent of flour weight, they produce a dough that is easy to handle in commercial bakery equipment and a loaf that "springs back" after pressure.

Production has not yet progressed beyond the pilot-plant stage.

Digest from "Crumb Softness From Soy Fractions," a paper by C. W. Ofelt, A. K. Smith and P. A. Belter, Northern Regional Research Laboratory, Peoria, Ill., presented at the 13th Annual Meeting of the Institute of Food Technologists, Boston, Mass. June 23, 1953.

MICROBIOLOGY

Lactic Bacteria Detection Fast With V-8 Medium

A new media that supports lactic acid type organisms and inhibits others usually found associated with them in sauerkraut and cucumber fermentations has been developed.

The new media gives counts that compare favorably with media commonly used for determining lactic acid bacteria yet the colonies are easily differentiated from miscellaneous acid forming organisms.

Medium has the following composi-

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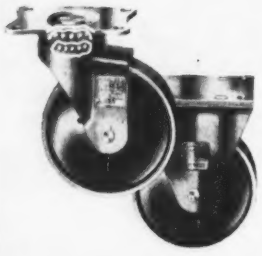

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tion: 500 ml. V-8 vegetable juice (filtered through 2 layers of cheese cloth), 10g. tryptose, 5g. lactose, 3g. beef ext., 15g. agar, 0.1g. brom cresol green, distilled water to make one liter. Following adjusting pH to 5.7, medium is autoclaved and again adjusted to pH 5.5-5.6. Pour plate technique is used.

Lactic acid organisms grown on the V-8 medium appear dark green to black with a halo that varies from slightly green in weak acid producers such as *Leuconostoc* to bright yellow in stronger acid producers.

An additional advantage of the new medium is that it inhibits surface and sub-surface growth thus enabling incubation 5 days without growth of spreaders.

Digest from "A New V-8 Medium for Determining Lactobacilli," by F. W. Fabian, R. C. Fulds and J. E. Merrick, *Food Research*, 280-89, May-June, 1953.

FATS & OILS

Inversion of Soybean Oil Inhibited by Phytic Acid

Peroxide development in edible oils such as soybean, resulting from presence of trace metals, can be effectively retarded by addition of phytic acid prior to deodorization.

Tests indicate that the range is above 0.005 percent and below 1.0 percent. Concentrations of 0.5 percent phytic acid were found inferior to 0.1 percent in both taste and oxidative tests.

Other edible oils—corn, cottonseed, peanut, and safflower—show improvement in oxidative stability when treated with phytic acid. Pilot plant investigations using 100-lb. lots of soybean oil confirmed the laboratory tests.

No toxicity studies have been reported, but concentrations of phytic acid proposed for use in edible oils are lower than those found in many foods.

Digest from "The Flavor Problem of Soybean Oil. XI. Phytic Acid as an Inactivating Agent for Trace Metals," by C. D. Evans, P. M. Cooner, H. A. Moser and A. W. Schwab (NRRL, Peoria, Ill.), *The Journal of the American Oil Chemists' Society*, 143-47, April, 1953.

Solvent Extraction Methods

Preliminary examination has been made of advantages and disadvantages of the three basic methods of extracting cottonseed (1) Extraction after pre-pressing, (2) extraction of raw flakes, and (3) extraction of cooked meats.

Chief advantage of (1) is that it is

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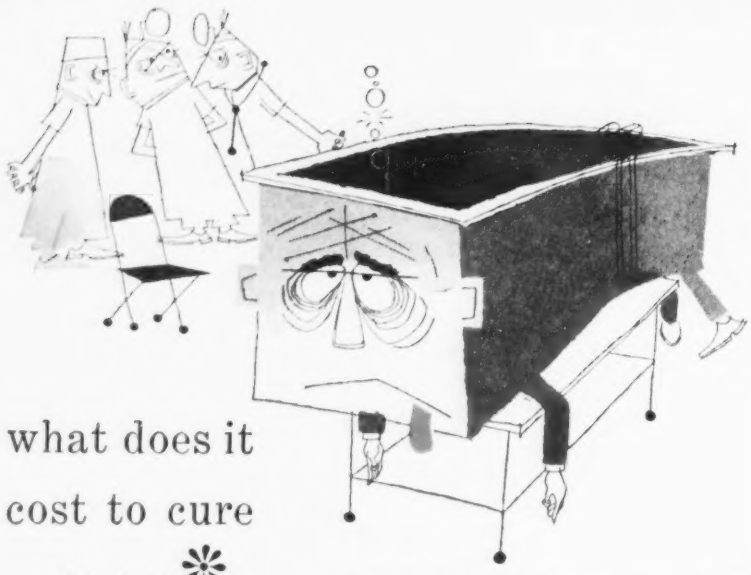

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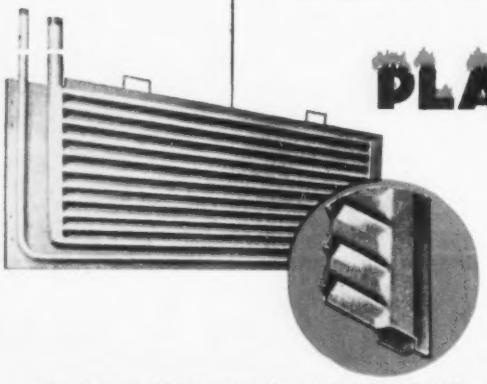

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easier to control, which may be the reason it is most widely used in the industry. It also gives the lowest residual oil in flakes, and can be used with any type of extractor.

Greatest appeal of (2) is possibility of improved oil quality. Method can be applied only with basket type of extractor, and percolation through a relatively thin layer of flakes is necessary. Greatest uncertainty of the process is meal quality.

In process (3) cooked meats are sent directly to extractor. Advantages are lowest first and operating costs. Products will be equal to those from (1).

Steam usage is greater for (2) and (3) than for (1), but electric power is greater for (1). Greater solvent loss is figured for (2) and (3). Product value will be greater in (1).

General conclusion is drawn that best method of extraction for a mill depends on the equipment available. Mills with cookers and hydraulic presses should consider direct extraction of cooked or raw cottonseed.

Plants with mechanical screw presses or expellers should probably stick to the pre-pressing and extraction method. In mills where soybeans are a secondary crop, the extraction of raw flakes is more advantageous. Where peanuts are a secondary crop, the pre-press extraction combination is best.

Digest from "The Solvent Extraction of Cottonseed," by R. P. Hutchins, *Journal of the American Oil Chemists' Society*, 56-58, Feb. 1953.

FRUITS & VEGETABLES

Bath Containing Wetting Agent Aids In Cleaning Berries

Effectiveness of washing raspberries for removal of thrips prior to processing is greatly increased by use of a wetting agent bath.

Critical point in operation is concentration of wetting agent—it should be such that berries will sink in less than 5 sec. Black raspberries have been found to sink in 2-5 sec. in a solution containing 0.1 percent sodium alkyl aryl sulfonate. And cleaning efficiency increases with concentrations up to 0.12 percent wetting agent.

Bath consists of tank and motor-driven wire-mesh or lugged endless belt set at a 45 deg. angle so that one end rests near bottom of tank. Berries, dumped into solution, sink to bottom of tank when they are thoroughly wetted, then are conveyed up out of tank and discharged to shaker washer containing clear water. Such

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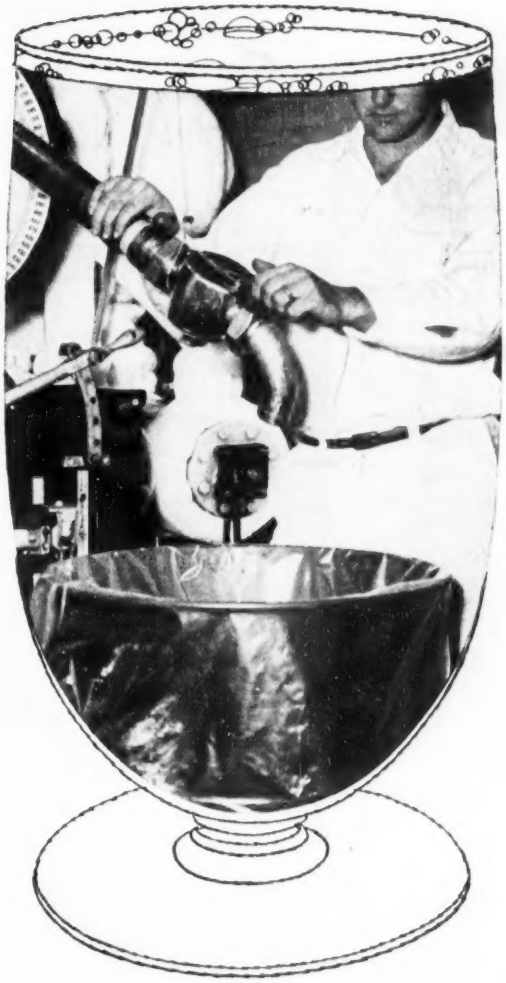
205P Wheel convyr.
205Q Light-duty trucks
205R Pails
206a (ad) Maturity tester
206b (ad) Natural spices
206c (ad) Body Cat. 5C
206A Fabrication
206B Rubber parts
206C Plastic surfacer
206D Glare eliminators
206E Cans
206F Stainl. wire
206G Glass insul. mtl.
206H Germicide
206 I Polysthylene
206J Concrete Bul. 34-1
206K Paint Cat. A-50
206L Safety posters
206M Quality reports
206N TV Cat. E.50
206 O Intercom. systems
206P X-Ray analysis
206Q Organoleptic test
206R Acetate sheets
206S Insecticide
214 Filter aids
215 Boxes
216 Hollow-screw processor

Coupon expires November 10, 1953

Don't forget . . . fill in name and address on other side

August 1953

Nature never knew



Top quality oranges vary widely in flavor as they are picked from the tree. Seasons and soils make a difference. Nature, it seems, never knew that you would demand an unvarying flavor in your favorite morning drink.

This posed a problem for the makers of nationally known Minute Maid fresh frozen orange juice. They whipped it by blending the product of many groves and different picking seasons into the even-flavored juice that reaches your breakfast table.

And VISQUEEN film helped solve the problem. VISQUEEN lines the 55 gallon drums used to store the concentrate until time for blending.

VISQUEEN is ideal for this purpose because it is unaffected by most acids, is strong and pliable even at 72 degrees below zero, is always uniform, 100% pure, tasteless and odorless.

The Minute Maid problem is only one of hundreds VISQUEEN has solved. Whatever *your* packaging, wrapping or protecting problem—a VISQUEEN converter will be glad to help. He's backed by the superior knowhow of The Visking Corporation in this field.

VISQUEEN®

IMPORTANT! VISQUEEN film is all polyethylene, but not all polyethylene is VISQUEEN. VISQUEEN film is produced by process of U. S. Patents No. 2461975 and 2632206. Only VISQUEEN has the benefit of research and technical experience of The Visking Corporation, pioneers in the development of pure polyethylene film.

THE VISKING CORPORATION, BOX RR-1410
Plastics Division, Terre Haute, Indiana

Please send names of VISQUEEN converters in my area.

Name.....

Company.....

Address.....

City..... Zone.... State.....

VisQueen® film . . .

a product of **the VISKING corporation**

World's largest producers of polyethylene sheeting and tubing

Plastics Division, Terre Haute, Indiana • **In Canada: Visking Limited, Lindsay, Ontario**

For more information, use coupon on page 157.

Take the Question Marks out of Liquid Processing

WITH *Accurate* NEPTUNE METERS

Why use wasteful methods of measurement when *accuracy* is so *easy* with Neptune meters? Fine-instrument precision gives you constant control over product quality at all times. No chance for human errors—the meters quickly pay for themselves by putting an end to spoiled batches, over-filling, spillage, etc. They save time, too, by eliminating slow weighing or batch tanks. Simple, easy to clean, they boost good housekeeping by keeping messy or hazardous liquids inside the pipe.

AUTOMATIC BATCH CONTROL

Ask to see the new Neptune "432" Auto-Stop—the meter that makes accurate batch mixing automatic. You simply push buttons to set the quantity of liquid required by the formula, open the valve, and the meter trips the valve shut at the right instant. It's just one of many types now available for handling more than a hundred different liquids. Composition bronze. Easy to read, easy to operate, easy to calibrate, and easy to service with interchangeable parts. For quick facts, just phone or write.

NEPTUNE METERS for *100* Industrial Liquids

F1

NEPTUNE METER COMPANY
50 West 50th Street • New York 20, N. Y.

Branch Offices ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER • LOS ANGELES • LOUISVILLE • NO. KANSAS CITY, MO. PHILADELPHIA • SAN FRANCISCO • PORTLAND, ORE. • Canadian Factory: TORONTO 14, ONT.

treatment removes 85-95 percent of the thrips as against less than 50 percent by water washing alone.

Digest from "Studies on Removal of Thrips From Cane Berries Intended for Processing," by J. E. Brekke, C. C. Nimmo, H. A. Swenson, C. E. Samuels and J. R. Brock, *Bulletin AIC-353*, Bureau of Agr. and Ind. Chemistry, Agr. Research Adm., USDA.

Good Potato Chips

Success in producing good potato chips lies mainly in choosing suitable varieties and in properly growing, harvesting and handling the stock.

Scientists have found that chipping quality can usually be measured in terms of specific gravity. That is, the heaviest potatoes make the best chips. Specific gravity is highest when starch content is at its peak.

But usual practice is to store potatoes at 40 F. to keep them from sprouting. This temperature is ideal for turning starch back to sugar within a few days. Also, certain amino acids in potatoes join with the sugars, causing the chips to cook dark and taste burned and bitter.

Reconditioning for 1-4 weeks at 70 F. will de-sugar many varieties of potatoes so they will again make good chips. Storing at 50-55 F. keeps up the starch level and maintains chipping quality, and sprouting isn't troublesome for 3-5 months. Chippers who control their own stock usually store part of the crop at 50-55 and part at 40 F. for later reconditioning.

The following varieties have been rated as outstanding for chipping: Canus, Chippewa, Kennebec, Rural New Yorker, Russet Burbank, Russet Rural, and Sebago.

Digest from "The Right Potato Makes Good Chips," *Agricultural Research* (Pub. by Agr. Res. Adm., USDA, Wash., 25), 10, July, 1953.

MEATS

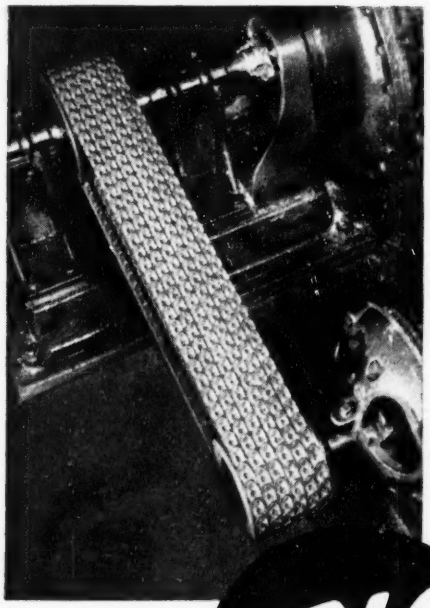
New Test For Horsemeat

Detection of fairly low concentrations of horsemeat in products made from beef, pork, or mutton is possible by use of a modified Paschke test.

This method depends on the observation that horse fat contains a much higher percentage of linolenic acid than does depot fat of normal oxen, sheep and pigs. The highest percentage found in the latter was 0.74 whereas the lowest found in horsemeat was 5.8.

In the new procedure, 25g. of uncooked, undried, chopped sample was extracted with petroleum ether in a Soxhlet appartus for 5-7 hr. Extract was dried overnight, using anhydrous Na_2SO_4, then filtered into a weighed

"Yes, but what will it do for me?"



We'll answer your question by giving you a run-down of what we call the three "E's" of Veelos, the adjustable v-belt . . .

Ease of Installation—the link construction of Veelos makes it easy to install without re-setting the motor or tearing down outboard bearings. In many cases installation is completed in 50% to 90% *less time* than it would take to make an endless v-belt installation.

Efficiency of Operation—because individual Veelos v-belts can be adjusted for correct tension, matched sets can be kept matched; vibrationless, full power delivery is assured.

Economy of Inventory—just 4 reels of Veelos in the 0, A, B and C widths can replace up to 316 different sizes of endless v-belts. Of course, if your machines use only one or two widths of v-belt, you stock only those widths of Veelos. Inventory is simplified, costly belt deterioration is eliminated and you save valuable stockroom storage space.

Put these three "E's" of Veelos to the test in your plant, under your own operating conditions, and you'll find the answer to your question . . . standardize on Veelos and *save!*

VEELOS
THE LINK
V-BELT

VEELOS DATA BOOK—Here's the complete story on Veelos, the adjustable v-belt. Book gives detailed engineering data, is fully illustrated. Write for your copy today!

MANHEIM MANUFACTURING & BELTING COMPANY
605 Manbel Street, Manheim, Penna.

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

For more information, use coupon on page 157.

Cross-section shows FURNANE Food Plant Floor on concrete slab with membrane. Installation shown is in meat packing plant.

AT LAST... the realistic solution to food plant floor protection

NOW you can put an end to floor troubles . . . and recurring floor costs. You can put down a floor to stay. Lasting beauty . . . long service . . . and assured installation techniques are, at last, all combined in a single floor developed especially for the food industry.

ATLAS FURNANE® FOOD PLANT FLOORS resist the whole range of corrosive food plant products and residues. Not only are they inert to acids, sugars and biologicals, but they also resist alkalies, oils, greases, salts and cleaning agents.

FURNANE Food Plant Floors are also strong physically. They may be installed by either tilesetters' or bricklayers' methods. A clean, smart appearing floor results . . . with flush and solid joints.

Why continue to pour money into questionable floor construction? Write for complete information today.

New Booklet Available. Send for Bulletin 3-2

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA
Houston 1, Texas

ATLAS FURNANE®
FOOD PLANT FLOORS
...the realistic solution to food floor protection.

® U. S. Pat. Office 553217

250-ml. flask. Solvent was removed by distilling over a steam bath followed by passing dry nitrogen through mixture while flask was warmed by infra-red lamp, and finally, subjecting to vacuum.

Percentage of linolenic acid was determined by ultra-violet spectrophotometric method of Brice, Swain, Schaeffer and Ault.

Based on analyses of large numbers of samples of known origin and others suspected of containing horsemeat, the authors adopted a figure of 1.10 percent (maximum) linolenic acid for all-meat products, and 1.50 for sausages and products containing fillers.

Digest from "Detection of Horsemeat in Meat Products by a Modified Paschke Method," by R. H. Crouse and L. A. Leffler, *Food Research*, 253-60, May-June, 1953.

SANITATION

Fluorided Waters

Because beneficial effects from fluoridation of public water supplies are obtained only within narrow concentrations, state board of health regulations usually require careful maintenance of 0.8-1.5 ppm. F operation by properly qualified and trained personnel, and regular assays.

Sodium fluoride, sodium silicofluoride, and hydrofluoric acid have been the compounds used, although ammonium silicofluoride and an aluminum fluoride and sulphate (Flural) have been tried with limited success. Both dry and solution feeders have been successfully used for addition of F compound, which must be proportioned into the water in very small amounts, 12.5 lb. of 70 percent hydrofluoric acid, or 35 lb. hydrofluosilicic acid per million gal. water.

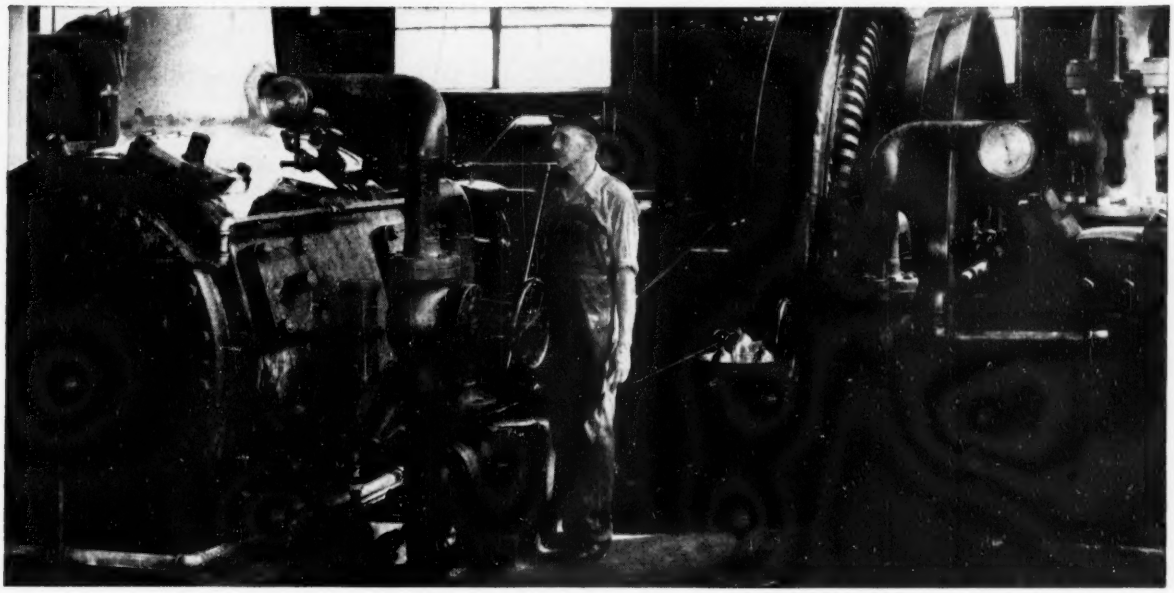
Cost is least with sodium silicofluorides ($1.75 per million gal.), most with sodium fluoride crystals ($2.67 per million gal.), but because of its more ready availability, sodium fluoride has been most used.

Digest from "Review of Practical Fluoridation," by Henry F. Munroe, *Industrial & Engineering Chemistry*, Vol. 45, 105-11, 1953.

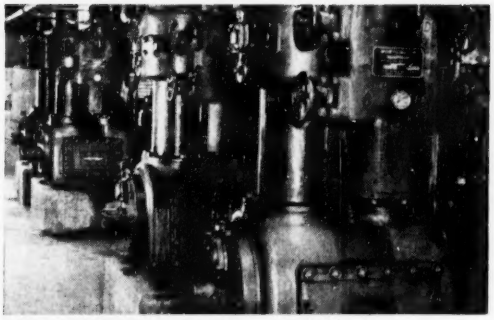
DDT Controls Blow-Flies

Unlike house-flies, blow-flies do not settle and live in infested premises. They enter only to lay their eggs on something that has attracted them. At night, and in cold cloudy weather, they settle on nearby vegetation.

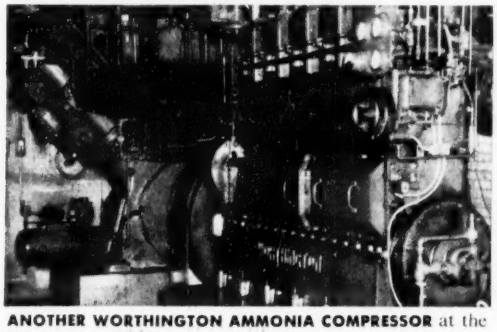
With this discovery it was found possible to control population in a London slaughter house by dusting vegetation and refuse in the vicinity



THE FIRST WORTHINGTON AMMONIA COMPRESSOR EVER BUILT, installed at Quincy Market 35 years ago.



DEPENDABLE REFRIGERATION is supplied by these four modern Worthington vertical ammonia compressors at Quincy Market's Watertown, Mass., plant.



ANOTHER WORTHINGTON AMMONIA COMPRESSOR at the Watertown plant. This one is a two-stage, "Y" type, driven by a Worthington Diesel.

Worthington ammonia compressor still in daily use after 35 years

Back in 1918, the Quincy Market Cold Storage & Warehouse Company in Boston bought its first Worthington ammonia refrigeration compressor.

This machine, a horizontal two-stage unit running at 164 rpm, and having a capacity of about 400 tons of sub-zero refrigeration, was the starting point for drastic changes in the engineering of ammonia compressors. Eventually, the principles of design established in this initial unit were adopted by all refrigeration manufacturers.

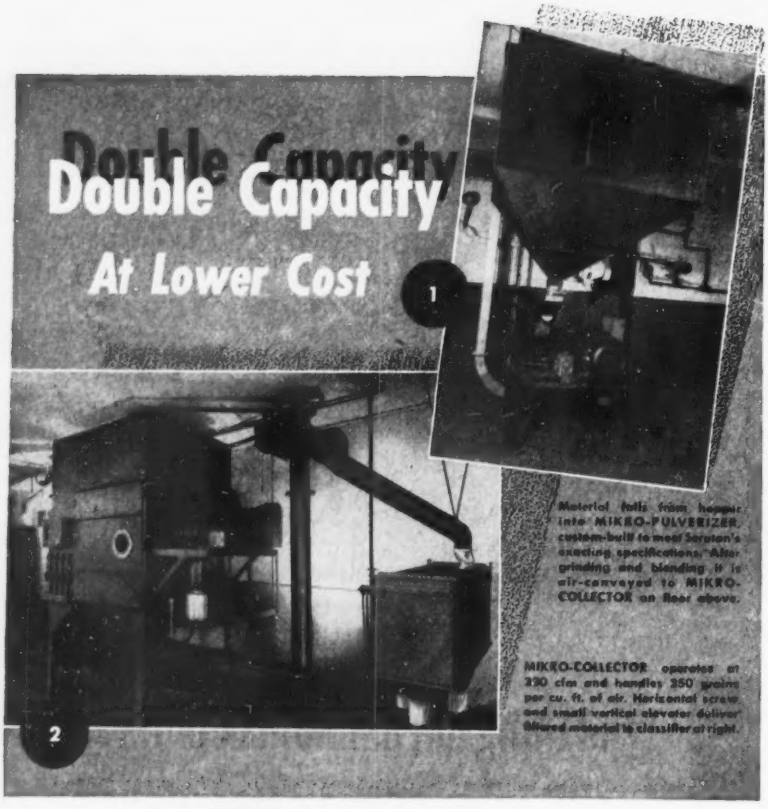
The compressor Worthington built for Quincy Market in 1918 is still in service—after 35 years of heavy-duty operation. And today, in Quincy Market's T Wharf and Sargents Wharf power plants in Boston, their new frozen food warehouses in Watertown, Mass., Portland, Maine, and their warehouse in Troy, N. Y., many other installations of Worthington equipment are supplying dependable, efficient refrigeration. The Quincy Market has been famous for over 60 years for the quality storage of millions of pounds of frozen foods.

For over half a century, Worthington refrigeration equipment has been serving the "first names" in the food industry. So when you think of refrigeration—think of Worthington. Get in touch with your nearest Worthington district office, or write Worthington Corporation, Air Conditioning and Refrigeration Division, Section A.3.5, Harrison, N. J.

WORTHINGTON

CLIMATE ENGINEERS TO INDUSTRY, BUSINESS AND THE HOME A-3-5

For more information, use coupon on page 157.


Double Capacity
At Lower Cost
1
Material falls from hopper into MIKRO-PULVERIZER, custom-built to meet Serutan's exacting specifications. After grinding and blending, it is air-conveyed to MIKRO-COLLECTOR on floor above.
MIKRO-COLLECTOR operates at 330 cfm and handles 250 grains per cu. ft. of air. Horizontal screw and small vertical elevator deliver filtered material to classifier at right.
2

MIKRO'S INTEGRATED SYSTEM has again proven itself to be both a money-saver and a time-saver in the combined functions of grinding, blending and dust control.

At the SERUTAN plant in Newark, N. J., this unified method (made possible by the incorporation of the MIKRO low pressure air conveying system) has out-moded batch handling by providing a continuous, automatic flow of material from a No. 2 DH MIKRO-PULVERIZER on one floor, to a MIKRO-COLLECTOR* on the floor above.

RESULTS:

100% increase in production . . . reduced cost due chiefly to elimination of batch handling . . . clean, dustless operation . . . improved working conditions . . . full product recovery . . . absolute protection of product against contamination.

This high-efficiency push-button operation steps up production by 100% for Serutan, but it can be engineered to meet almost any production quota on a wide variety of materials. It will pay you to investigate its possible application in your own plant set-up. Write now for information and descriptive literature.

*Patents applied for by H. J. Hersey, Jr., and Pulverizing Machinery Company.

PULVERIZING MACHINERY COMPANY

97 Chatham Road • Summit, New Jersey

MIKRO-PULVERIZER (FINE) ATOMIZER (ULTRA FINE) COLLECTOR (100 PER CENT)
REG. U.S. PAT. OFF.

2587

PRESERVE OUR HERITAGE: FAITH, FREEDOM AND INCENTIVE

daily with DDT powder. Aim was to keep a continuous film of powder over surfaces where the flies rested and fed. Modified to meet local requirements, method can be applied to any establishment with a blow-fly problem.

At a refuse station it was found that ground had become infested with maggots. Blow-flies were emerging at the rate of 108,000 a day. Various formulations of DDT and benzene hexachloride were tested in combating the infestation. Most effective treatment was application of a 5-percent DDT dust twice weekly at rate of 34 oz. per 1,000 sq. ft. This reduced emergence of flies to 20 percent of normal level and killed 96 percent of emerging adults. Net effect was 99 percent destruction of insects.

Migratory habits of blow-flies were investigated by feeding them a solution of a radioactive phosphorus salt in place of drinking water and releasing them. Flies were then trapped within a 2-mile radius and checked with Geiger counters, 300,000 being thus checked. It was found that released flies were caught in traps two miles away within two days.

Digest from "Control of Blow-Flies," by A. G. Thomson, *Food Processing, Packaging, Marketing*, (Pub. 33 Tothill St., Westminster, London.) 22, 106-107, March, 1953.

Sheets of Gas-Proof Material Aid Fumigation in Storage

Bags of cereals and nuts, or cartons of dried fruit can be fumigated in the absence of gas-tight rooms by covering stacks with gas-proof sheets of large size, and admitting fumigant under the cover.

Balloon fabric, rubberized cotton, and sheets of polyvinyl chloride up to about 60 x 30 ft. in size have been used. Sheets may be joined by rolling overlapped edges together. Bags of grain or sand, or lengths of chain may be used to seal sheets to floor—which should be smooth if possible.

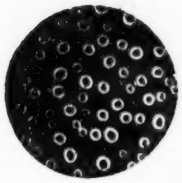
Methyl bromide, ethylene oxide, and hydrogen cyanide have been used in fumigations by this method. Amount of leakage from stacks depend on their size, shape, smoothness, and effectiveness of floor seals.

Concentrations of fumigants must be higher to offset leakage; for example, 7.5 mg. methyl bromide per liter of air for 24 hr. (180 mg.-hr.) or 250 mg.-hr. ethylene oxide are required to adequately kill insects, but larger dosages are recommended for this method of fumigation.

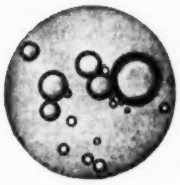
A methyl bromide application of 16-20 oz. per 1000 cu. ft. per 24 hr. (360-480 mg.-hr. per liter) is suggested for insects, slightly less for

RIGHT IN YOUR OWN BACK YARD...
BY WEST
BUGS KNOW IT'S THE KISS OF DEATH WHEN THE WEST MAN TURNS ON THE NEW ATOMIZER
A TWIST OF THE WRIST AND IN TWO MINUTES THIS PLANT WILL LOOK LIKE A LONDON FOG!
WOW! THIS JOB USED TO LOUSE UP THE WEEKEND FOR FIVE MEN. AT DOUBLE TIME!
WEST ATOMIZERS? WOW! WE'RE SITTING DUCKS IN THIS CRACK!
YOU'LL STILL SWING A MOP, THUNDERFOOT. THIS IS A BUG KILLER, NOT A JANITOR!
BET THIS BLOWS MY JOB RIGHT OUT THE WINDOW!
TRAPPED BY VAPOSECTOR! SAME DIRTY TACTICS THAT WIPED OUT OUR COUSINS AT THE CANNERY!
JIGS UP! IT'S THIS OR WEST FUMIGANTS OR WEST RESIDUALS!
WHAT STRATEGY! THEY'VE MAPPED OUT AN INSECT CONTROL PLAN THAT'S STOPPED US COLD!
HEY! WAIT A MINUTE... WHO'S GONNA CARRY US OUT?

Fog 1,000 cu. ft. in 3 seconds for 5¢



Top — Magnified photo of uniform 8 micron droplets produced by precision-machined suction nozzles of West Atomizing equipment. "Dry mist" remains air-borne for prolonged periods.



Bottom—Magnified photo of droplets produced by ordinary hydraulic compressor sprayers. Vary from 2 to 300 microns. Larger droplets fall, wetting floors and reducing effectiveness.

– and with only 1 ounce of Vaposector – for complete control of flying insects. Double this dosage for crawling insects.

Impossible? Not with a permanently installed West Atomizer. 10 suction nozzles atomize a "dry mist" of extra-potent insecticide. Droplets are so small they hang in the air . . . seep into every crack . . . penetrate delicate insect breathing tubes.

It's an unbeatable combination. High potency Vaposector – sprayed with super-efficient West atomizing equipment. One man does the job. There's only one valve to open. You can fog your entire plant simultaneously.

West has a complete line of insecticides and atomizing equipment ranging from permanent installations to portables. A West specialist will be glad to make a survey and set up an Insect Control Program to fit your needs. Without obligation. Just mail the coupon.

WEST DISINFECTING Company

42-16 West Street, Long Island City 1, N. Y.

YES! Tell us about your Insect Control Plan

☐ Please send me the West Insect Control Booklet

☐ Have a West Insect Control Specialist call DEPT. 8

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

For more information, use coupon on page 157.

BELTLINE for a SHOESTRING

Carrying potatoes looks like an easy job for any conveyor belt, but experienced canners know that it presents quite a problem.

Potatoes, like many fruits, vegetables, dairy and confectionary products, pick up objectionable tastes and odors from ordinary conveyor belts. That's why leading users insist on Republic Canners Belting like the white one (pictured above) installed in the world's largest shoestring potato cannery. Of course there are other reasons, too. Users have found that Republic Canners Belting will withstand constant washings with scalding water and chemicals; that it is built for lasting, trouble-free performance, and that when the product to be carried is oily or greasy, there's a Republic Canners Belt made of oil and grease resistant Reprene.

Republic Industrial Rubber Products like this are working right now in every industry in every state, and wherever there's a Republic Product, there's a service policy . . . a policy that gives you "Production Protection" on even your toughest job. Get the facts today!

Your local Republic Distributor can help you plan, select, apply and maintain any Product of Industrial Rubber. If his name is not listed in the yellow section of your telephone directory, write us for his name and address.

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INDUSTRIAL RUBBER PRODUCTS

Food Engineering Reports
LATEST TECHNICAL NEWS
In Keeping Up With Field . . . page 183

rodents. Insect infested grain should be treated with 3-5 lb. ethylene oxide per 1000 cu. ft. for 24 hr. Carbon dioxide applications against rodents requires about 50 lb. per 1000 cu. ft. of air per 24 hr.

Digest from "Some Recent Developments in Fumigating Under Gas-Proof Sheets," by R. H. Thompson and E. E. Turtle, *Chemistry & Industry*, 365-71, April 18, 1953.

ENGINEERING

Ultrasonic Radiation In Food Industry

Among better known effects of ultrasonic radiation in food processing are cavitation, emulsification, agitation, homogenization, depolarization of long-chain molecules, agglomeration and coagulation of precipitates in liquids or gases, and production of colloidal suspensions of solids in a liquid phase.

These mechanical effects result from application of radiations of a frequency in excess of 20,000 cycles per sec., and may be described as shaking of particles of microscopic size in a rhythm controlled by frequency of radiation.

In cavitation, for example, ultrasonic energy of high intensity causes particles to explode with production of small vacua, into which liquid will collapse with great force, producing an emulsion.

Ultrasonic oscillations can liquefy certain gels without addition of water or heat, and substance will gel again when irradiation ceases. Other products that may benefit from ultrasonic treatment are ice cream, mayonnaise, curd, marshmallow, and fondant. In sugar refining, ultrasonic vibrations greatly accelerate the rate of crystallization.

A further application is in improving bouquet and texture of wines and spirits. Water subjected to ultrasonic beams of high intensity yields nascent oxygen which combines with some of the water to bring about formation of hydrogen peroxide.

Excellent results can be obtained in homogenization of milk, but process is uneconomical due to price of equipment and large volume of milk to be treated.

Digest from "Ultrasonics," by W. Summer, *Food Processing, Packaging, Marketing*, (Pub. 33 Tothill St. London) 22, 96-99, March, 1953.

Electronic Separation

—Continued from page 95

double row with a belt conveyor between the rows. Machines are mounted on tracks so they can be pulled out of a line for servicing (see photo).

Sorters are fed from overhead screw conveyors that discharge the almonds into hoppers at the top of each unit. Sorted nuts move from two outlet chutes onto a divided conveyor belt. Perfect ones go to processing; rejects from the primary sorters go to re-sorters.

Machines in this installation (Gromax Type A) make use of a patented vibratory feed that delivers products to a vertical tube one by one. This feeding tube ends just above a photo-electric scanning unit that views each nut from three sides, thereby reducing dead spots to a minimum.

The mechanically operated ejector is just below the scanning unit. It consists of a solenoid-operated gate that deflects the nuts into good and bad channels, respectively.

The electronic circuit is engineered in such a manner that the machine is capable of giving a stable performance for very long periods. The three photo-electric cells in the scanning unit are conditioned on a standard color card, which is inserted in a holder facing the cells. This provides a reference level for the amplifier circuit.

The three independent cell circuits are compensated for non-linearity and then passed through a multi-stage amplifier. This converts the feeble impulses of the cells to pulses of sufficient magnitude to operate the gate-controlling solenoid.

Power supply is built into every machine, making each one an independent unit capable of operating from a single wall outlet. To cope with line voltage variations, every machine has a highly stabilized and smoothed d.c. high tension (250-500v.) supply for the amplifier, and a low voltage d.c. unit for the lamps.

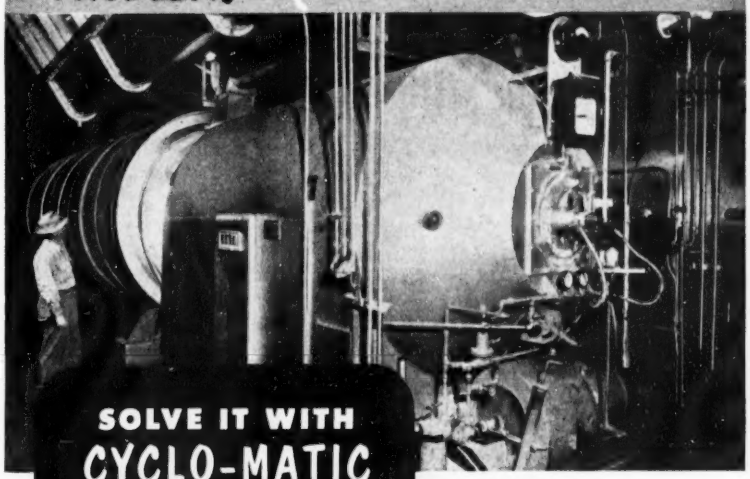
Two Other Sorters

Selectors for other size products are also available. The Type B machine is primarily intended for peas, beans, coffee, and products of similar sizes. It differs from the Type A unit in that there are actually two machines built into one cabinet. However, each operates entirely independent of the other.

Instead of having the mechanical ejector mechanisms, this machine is provided with compressed air ejector

WHAT'S YOUR DEHYDRATING PROBLEM?

Cost? Product Quality? Space Limitations? Vitamin Loss? Uniform Color and Dryness? Fuel Consumption? Installation?



SOLVE IT WITH CYCLO-MATIC DRYING

FOUND ONLY IN ARDRIER DEHYDRATORS

CYCLO-MATIC Drying solves the dehydrating problems listed above, and many more, by its efficient application of the "flash" drying principle and simple 3-pass drum design, an exclusive Heil feature.

The three drums of the dryer are arranged concentrically, one within the other, all mechanically interlocked and rotating at the same speed. Material enters the center cylinder at the burner end. As it progresses, it is repeatedly carried to the top of the cylinders by built-in flights and showered through the drying medium. Rapid moisture evaporation keeps material relatively cool (130°-155° F.) as the drying fan draws it through the center cylinder, then back through the intermediate cylinder, and forward again through the outer cylinder. Velocity and heat of the air stream are different in each of the three drums to meet changing rates of evaporation. Maximum exposure of all particles to the heated air in a "flash" of time assures maximum retention of all vitamins and nutrients in the material.

Find out about the many other features that help you increase product quality at lower cost. Send the coupon for bulletins.

ARDRIER DEHYDRATORS are manufactured for ARNOLD DRYER COMPANY by THE HEIL CO.

HIGHEST QUALITY OUTPUT FOR

- Apple Pomace
- Beet Pulp
- Blood Meal
- Cannery By-Products
- Citrus Pulp
- Crab Scrap
- Distillers' Grains
- Fish Meal
- Meat Scraps
- Potatoes
- Sages
- Sludges—Vacuum Filtered
- Sugar Cane Bagasse
- Tankage
- Tomato Pomace
- Wet Corn Millers By-Products
- Yeast Grains

and

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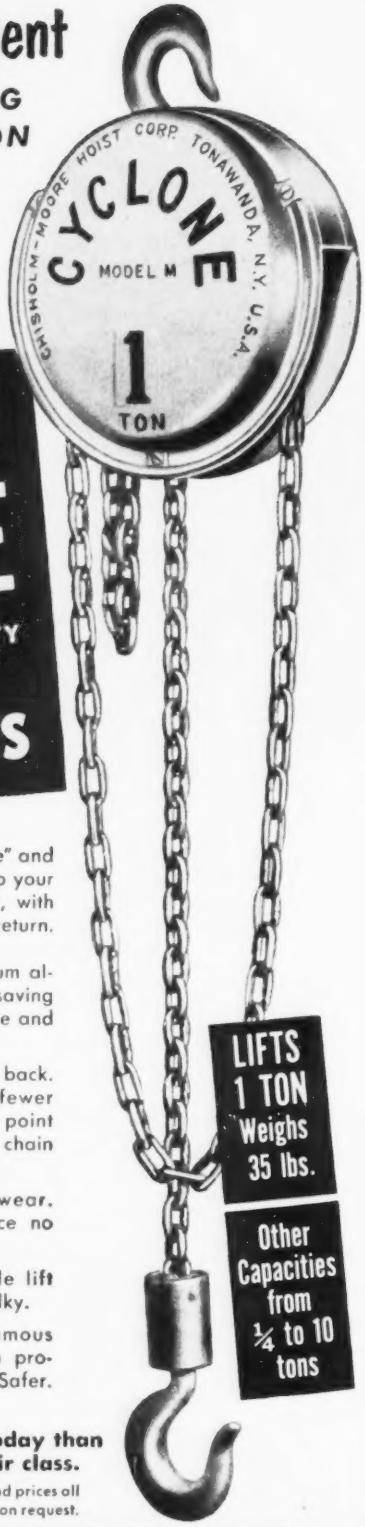
CHAIN HOISTS



HERE ARE ONLY 5 PLACES "where" and 5 reasons "why" CYCLONE Hoists can help your men get lifting jobs done safer, quicker, with less physical effort. Increase labor-dollar return.

PORTABLE—The lightest weight aluminum alloy hoist in America. Encourages time-saving use because it can be picked up with ease and carried anywhere.

EASY OPERATION—Saves muscle and back. Advanced construction features and fewer parts combine to reduce friction to a point where the CYCLONE is the most efficient chain hoist available.

LIFETIME LUBRICATION—Reduces wear. Prolongs hoist life. Efficient performance no longer depends on periodic oiling.

LOW HEAD ROOM—Highest possible lift where ceilings are low and loads are bulky.

"HERC-ALLOY" LOAD CHAIN—Famous "HERC-ALLOY" welded steel load chain provides complete flexibility. Non-kinking. Safer. Longer life.

More CYCLONE Hoists are in use today than any other aluminum hoist in their class.

BULLETIN No. 145 illustrates, describes and prices all CYCLONE Chain Hoist models. Copy sent on request.

CM HOISTS AND CHAIN

CHISHOLM-MOORE HOIST DIVISION
COLUMBUS McKINNON CHAIN CORPORATION
TONAWANDA, NEW YORK
DISTRICT OFFICES: NEW YORK, CHICAGO, CLEVELAND

valves that enable it to inspect from 80 to 100 particles a second.

Output of the twin machine ranges from 250 to 300 lb. per hr. for large products, and 100 to 120 lb. for small ones.

The Type C selector is intended for rice, wheat, and small seeds such as alfalfa and clover. It has the same preamplification as its big brothers but a somewhat simplified scanning unit embodying a single photo-cell. This was found to be sufficient for the small grains, since in most cases the undesirable particles are discolored all around.

It has been found that a solenoid-operated air valve may operate at speeds of 250 to 300 cycles per second, but the useful upper limit appears to be about 120 cycles.

It was obvious, therefore that to obtain a commercially acceptable output for very small seeds, speeds of a very high order had to be obtained. For this reason, the Type C is provided with a multiple ejectory ring capable of speeds up to the range of 1200-1500 cycles per second.

Take Fruit, Too

These machines were developed especially for selection of grains, seeds, nuts, and similar items. However, there are a number of fruits that can be handled on them, provided modifications are made in the collector bins to avoid bruising.

In the case of cranberries, good results have been obtained when the selected fruit was dropped into a trough of running water, which, incidentally, provided a very efficient convevor.

End *(Resume reading on page 96)*

National Meat Trucking

—Continued from page 96

rier Bureau requirements regulate driver time to 10 hr. per day followed by 8 hr. of rest.

Trailers used on West Coast runs (one is shown in lead illustration) are the prides of the fleet. Their bodies are made of stainless steel, inside and out.

On the shorter runs, conventional flat-sided trailers are used, some with single and others with tandem rear axles, according to size of loads and weight limits of the states in which they are used. Eighty percent of the trailers have tandem rear axles.

Both conventional and COE (cab-over-engine) tractors are used. Twenty percent of the tractors are COE's.

Use of the White COE Model 3000 tractor (seen in second illustration), has permitted carrying approximately 3,000 lb. more payload as compared with the conventional tractor with the motor out front. No COE tractors operate in states where the "bridge formula" is employed in calculating maximum allowable gross weights and where allowable loads may be limited, because of the shorter wheelbase lengths.

Livestock Trucks

Two of the Dugdale trailers have slat-sided bodies. These are used to haul purchases of livestock from various markets and local stockyards. They have tandem rear axles and are pulled by conventional tractors.

As to relative cost of distributing its carcasses of fresh beef by the various means in use—its own equipment, rail, or common and contract motor carriers—Dugdale says it is the same. The common and contract carriers parallel the rail rates.

The company's equipment is credited with providing a topnotch, quick service.

With company equipment, the time enroute is much less than by conventional rail-freight. It is also reported to be less than by contract motor carriers, principally because the units remain under company control and can be made available for shipping on the exact dates when desired. This availability also enables a better plant-production schedule in accordance with desired shipping dates.

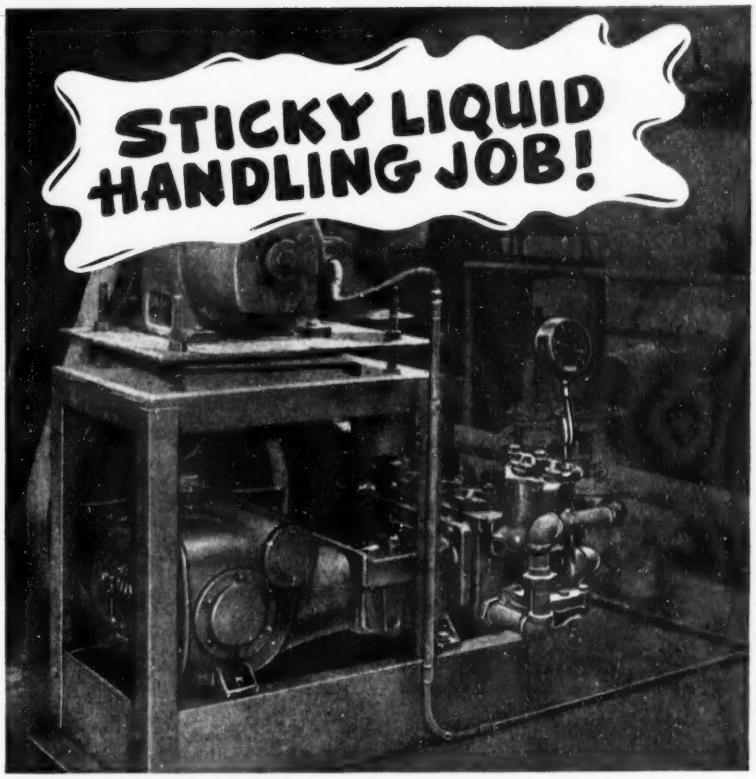
Maintenance Plan

All major repairs to the Dugdale automotive equipment are made in a company shop at the St. Joseph plant. On emergency service or repairs that have to be made on the road while the units are out on their various trips, the company drivers are instructed to have the work done at the nearest shops equipped to render suitable service.

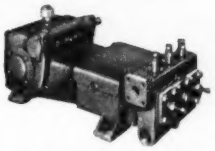
The latter shops include truck and trailer branches or dealers and, where necessary, special shops at which emergency repairs can be made on the refrigerating units. With an excellent inspection and preventive maintenance system at the main plant shop, the above plan of procuring road service has proven satisfactory.

The company units are painted a bright orange with contrasting black trimming. The tractor and trailer lettering is large and of the distinctive Dugdale trademark type. Thus, a definite company advertising value is attained.

End (Resume reading on page 97)



Handled by Deming Pumps



Pumping starch-paste is the job of four Deming Fig. 2993 "Oil-Rite" Horizontal Triplex Pumps in a factory making large paper bags for a wide variety of products. The paste is the adhesive used in sealing the bottoms of the heavy-duty bags.

From three to six months was the maximum life of all pumps used before the Deming "Oil-Rite" Triplex Pumps were installed in April 1951. Up-to-date, all four Deming units have pumped away without a breakdown.

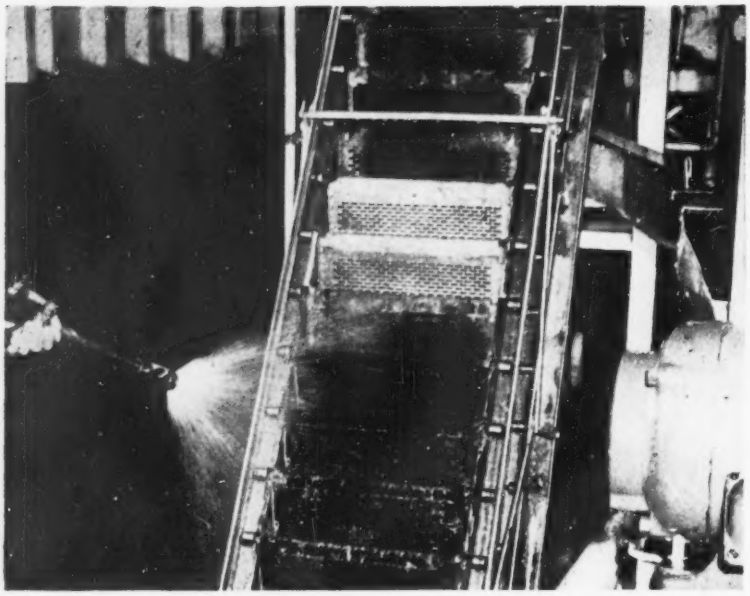
This is one of a multitude of high pressure pumping jobs handled successfully by Deming Fig. 2993 "Oil-Rite" Horizontal Triplex Pumps. Designed for working pressures up to 1000 pounds, these units are built to produce a steady, uniform discharge with practically no vibration.

Ask your Deming Distributor or write us for full details.

THE DEMING CO. • 556 BROADWAY, SALEM, OHIO

DEMING *Industrial* **PUMPS**

For more information, use coupon on page 157.



Spray method found effective in chemical sterilization

Oakite Bactericide or Sanitizer No. 1 covers every inch of surface—gets into inaccessible areas.

Many food plants are solving sanitation problems and saving both time and money by using the portable Oakite Sprayer No. 374 and an Oakite chemical sterilizer solution. Here's why:

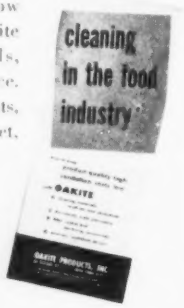
(1) Oakite Bactericide, patented, kills more bacteria in less time. Here's the secret. The pH of Oakite Bactericide is practically neutral. This makes possible the almost instant release of available chlorine. Quick chlorine release—Quick bacteria-killing action.

(2) Oakite Sanitizer No. 1—a highly concentrated quaternary ammonium compound. This effective chemical sterilizer provides long-lasting residual germicidal action. Especially recommended for general use after cleaning. Excellent for sanitizing coolers, pails, pasteurizers, sanitary piping, etc.

(3) Either of these specialized materials, when applied with the handy Oakite Sprayer, saturates all surfaces, cracks and crevices with a potent, germ-killing mist. This method permits covering wide areas more quickly. It makes a little material go further and do more.

• • •

Send for this illustrated bulletin which gives more details. It also tells other ways you can keep product quality high and sanitation costs low with specialized Oakite cleaning materials, methods and service. Write Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.



SPECIALIZED INDUSTRIAL CLEANING

OAKITE

Technical Service MATERIALS • METHODS • SERVICE Representatives in Principal Cities of U. S. and Canada

Questions & Answers

THIS MONTH'S PROBLEM

Question—*One of our production processes involves adding a number of ingredients in succession to a kettle during cooking and mixing period. Occasionally, we lose batches due to accidental omission of some ingredient. Unfortunately, amounts of some ingredients are so small that they hardly show up in finished batch weight, yet are of great importance from standpoint of controlling product uniformity. Have you any ideas on how we can set up a relatively simple, inexpensive system of checking each batch to reduce these errors and make the process as foolproof as possible?*

Answer to June Problem

The Question Was—We would appreciate your suggestions on preventing discoloration of frozen noodles. We have been making homemade noodles, consisting of hard wheat flour, whole eggs, yolks, salt, and water. Mixture is kneaded and noodles are then hand-formed. Without drying, noodles are dusted with starch to prevent them from sticking to one another, packed in cartons, and then frozen. In about a week, frozen noodles turned grey.

Answer—First, we suggest that you look into the possibility of substituting durum wheat for hard wheat flour. Durum wheat has a high carotene content and does not tend to turn grey when used in noodles. We know of one manufacturer who used hard wheat flour for the manufacture of egg noodles, only to find that his product turned grey.

Eggs may be another source of trouble. Slightest contamination of eggs with iron or copper will result in a sulphite reaction. As a result, noodles can turn grey when such eggs are employed.

Also, there is a possibility of a sugar-protein reaction (browning) taking place in the eggs, which, in the presence of starch may cause the grey discoloration.

Too, rough surface created by starch-dusting may cause greying of the noodles.

Re Meat Discoloration

Question—From time to time, we have encountered off-colors, mainly of a brownish nature, in our packaged

meats. Can you suggest possible causes and corrections?

Answer—The natural color of most meats is red, and chemistry of color-producing compounds and their modifications has been extensively studied. You do not mention whether your meats are fresh or cured, and this is significant.

It has recently been reported that presence of oxygen is necessary for maintenance of a red color in fresh meats, while its absence is required to preserve red color of cured meats.

Therefore, fresh meats should be packaged in an oxygen-permeable material, while cured meats are best vacuum packaged.

Other factors may be influencing the picture, however. For example, lowering holding temperature will retard browning. Salt, certain spices, and even chemicals derived from wrapping paper have been known to produce browning, as has ultraviolet light from germicidal lamps.

Speaking of light, it is important to make sure that lighting of display cabinets includes some lamps producing red light, for which filament lamps are usually superior. Only red color that can be seen on the surface of a meat product is, after all, but a reflection of red wave lengths in illumination.

Pumpkin-Pie Spice Formula

Question—Can you furnish us with a formula for a pumpkin-pie spice? We propose to put up this spice mix in about 2-oz. capacity containers for retail trade.

Answer—Following formula suggested is basic, and can be modified to meet your requirements: Ground Batavia cassia, 50 lb.; ground allspice,

How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What is *Your* Probem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

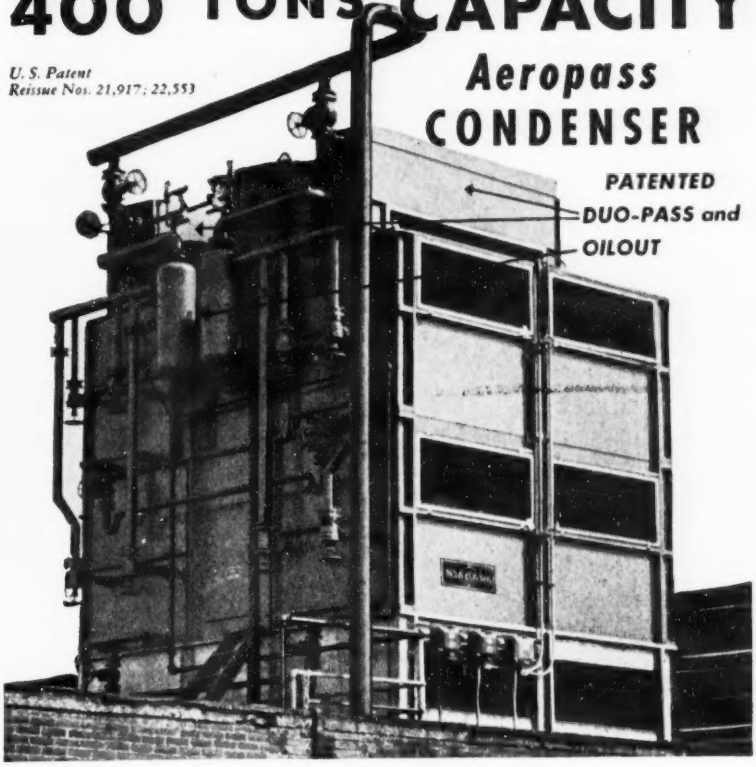
Write to Questions & Answers, Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

400 TONS CAPACITY

U. S. Patent Reissue Nos. 21,917; 22,553

Aeropass CONDENSER

PATENTED DUO-PASS and OILOUT



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SAVE CONDENSER WATER...
SAVE UPKEEP COST

For large refrigeration systems, NIAGARA gives you a choice between a battery of condensers (that may be cut on or off with the load) or a high capacity condenser that saves space.

Both have the patented "Duo-Pass" and "Oilout" that remove superheat and keep the system free of oil. Results: you save one-third or more of power cost and upkeep expense. Niagara Patented Balanced Wet Bulb Control gives lowest head pressure operation automatically. *Write for Bulletin 111.*

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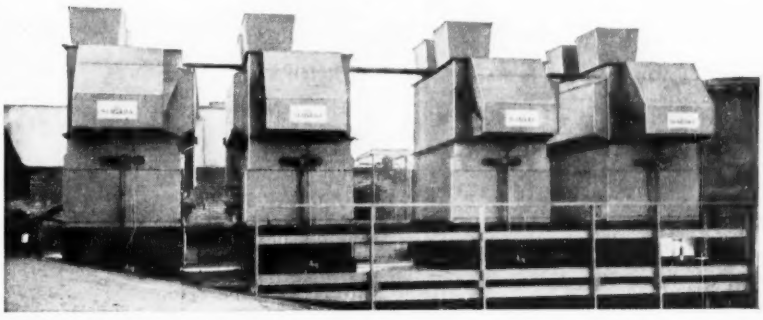
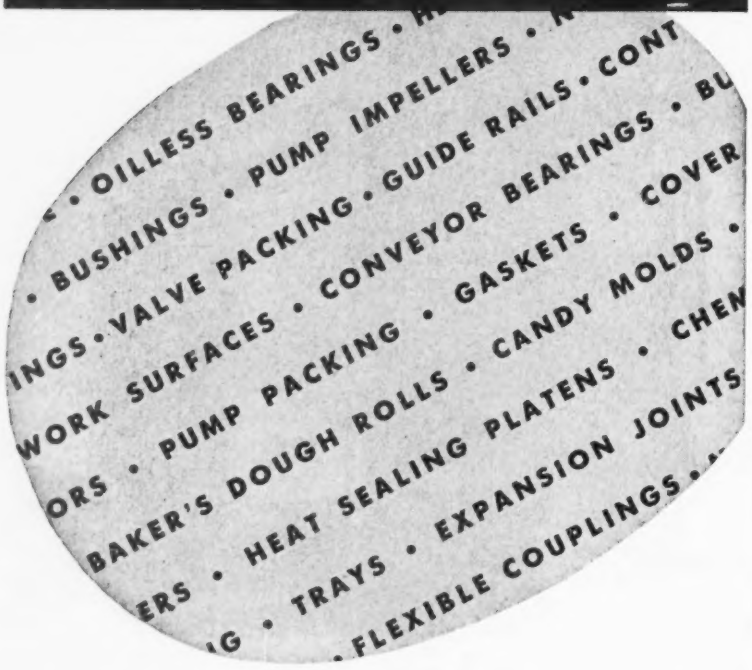
Field Engineers in Principal Cities of U. S. and Canada



For more information, use coupon on page 157.

Check TEFLON'S Applications for Better Food Processing



Where you can't use a lubricant—*use Teflon.** Its natural slipperiness makes it an ideal bearing or bushing material on food plant equipment.

Where you can't have contamination—*use Teflon.* Tasteless, odorless, inert to all food acids, alkalis, solvents, detergents, it is the ideal material for valve and pump packings, gaskets, expansion joints and other connectors for glass and stainless piping and equipment.

Where stickiness is a problem—*use Teflon.* Its extremely antihesive, waxy surface is ideal for work surfaces, candy molds, coverings for conveyors, guide rails, trays and dough rolls. *Nothing adheres to Teflon.* Products are improved. Clean-up time is cut to a minimum.

Check Teflon's applications in your plant and tell us your problems.

*duPont's trademark for its tetrafluoroethylene resin

UNITED STATES GASKET COMPANY

FLUOROCARBON PRODUCTS DIVISION
CAMDEN 1, NEW JERSEY

Representatives in Principal Cities Throughout the World

5 lb.; ground cloves, 5 lb.; ground nutmeg, 5 lb.; and ground sweet orange peel, 5 lb.

Spices are run through a No. 30-mesh sieve, blended with orange peel, and filled into containers which are then capped and labeled.

On Keeping Fats Fluid

Question—We have the problem of melting a fatty material, which must then be metered at a very low rate and held at a closely-controlled temperature. As no steam pipes are near the proposed area, we would like to accomplish our objective electrically. Just what can we do?

Answer—One way this problem can be licked is to use a suitable size tank, equipped with a jacket and provided with means for circulating a heating medium through jacket. This medium might be water or an oil, which is warmed to desired temperature by electrical heating elements. These heating elements are now on the market, and they are known as circulation heaters. They are ideal for mounting in the heating medium circuit. And they are available in various wattages.

To give you flexibility in rapid melting, plus close final temperature control, it is desirable to select one fairly large unit heater as well as a small one. Each heater should be governed by a thermostat. The large heater can be set to function until material is close to final temperature. Upon reaching this point, heater will "kick out" and allow the smaller one to maintain the desired temperature.

With this type of arrangement, a pump is required to circulate the heat-transfer medium. For this purpose, a centrifugal pump should prove suitable.

A less elaborate, but perhaps more adequate, arrangement would involve heating oil or water medium in a separate tank or kettle, equipped with a thermostatically controlled, electric, immersion-type heater. The hot medium should then be circulated, by pump, through jacket of kettle. Pump should be actuated by a thermostat with a bulb immersed directly in the liquid fat.

Exact arrangement to be selected will depend upon precision of control required, limitations on investment, available space, and other factors. In any case, however, it is well to mention that use of hot oil under pressure indicates a need for suitable safety and fire prevention precautions. A leak in pressure piping may be responsible for an operator becoming severely burned by hot oil. A sticking thermometer might cause over-heating of fat.

Canning Vegetable Soup

Question—Last month you furnished me with complete instructions on preparing canned split pea soup. We were so pleased with the product that we would like to try making another canned soup. Can you supply us with information on manufacture of a good canned vegetable soup?

Answer—Try this formula: Carrots, 11¾ lb.; potatoes, 11¾ lb.; sweet potatoes, 2¾ lb.; lima beans, 1¾ lb.; peas 2½ lb.; corn, 1¾ lb.; onions, ¾ lb.; celery, ¾ lb.; pimientos, ¾ lb.; sugar, 2½ lb.; salt, ¾ lb.; beef extract, 2½ lb.; tomato puree, 42 lb.; barley, 4½ lb.; cracker meal, 2½ lb.; beef suet, 2 lb.; noodles (alphabets), water, 498 lb.; and pepper to taste.

Now to make the soup: In steam-jacketed kettle (with agitator), add 83 lb. of water and the beef extract. Bring batch to a simmer and introduce the barley, celery, salt, onions, and pepper. About 4 min. later, add the noodles, corn, and pimientos. Then, about 4 min. later, add potatoes (white and sweet), carrots, beans, and peas. Two min. later, introduce pulp, sugar, and beef suet.

Continue simmering, add remaining water and then cracker meal. Can and heat-process.

Has Caking Problem

Question—Please tip me off on what must be done to prevent caking of my product. Upon leaving the factory, it is free-flowing and has a very low moisture content—about 5 percent. Samples are being returned that are as hard as a rock, even though analysis show a moisture content which is 1 or 2 percent below that of the product on day of shipment.

Answer — Unquestionably, your product went through a moisture-loss-and-gain cycle, which ultimately caused it to cake.

Repeated evaporation of a small amount of moisture from slightly moist sugar, for example, will cement crystals into a solid mass.

Two other factors—temperature and moisture—will bring about caking.

Supposing you packaged your product—and it was dry—on a warm, low-humid day, and it was then subjected to colder and more moist condition. Product would then absorb this moist air and begin to cake.

Temperature-caking can be prevented by storing the product in a room where there are minimum fluctuations in temperature. If exposures to improper temperatures are for only a short period, insulation of that package may prove satisfactory.

Pressure—due to high stacking of

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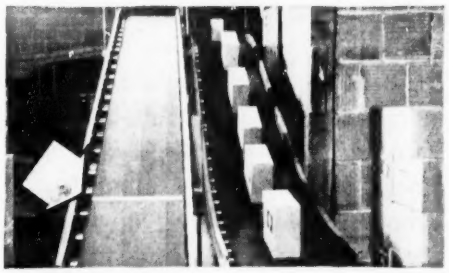
CONVEYOR BELT LACING



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★ Excellent for Package Conveyors, Portable Loaders, etc.
★ In canneries where corrosion or rust is a problem specify Alligator made of Stainless or Monel.
★ For magnetic separators or anti-sparking specify Alligator made of Everdur.
★ Separable and smooth on both sides.
★ 12 sizes. For belts from 1/16" to 5/8" thick—and *any width.*

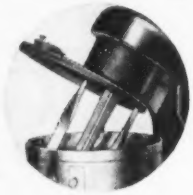
Order from Your Supply House. Ask for Bulletin A-60
FLEXIBLE STEEL LACING CO., 4646 Lexington St., Chicago 44, Ill.

JUST A HAMMER TO APPLY IT

For more information, use coupon on page 157.

DAY PONY MIXERS

Photo Courtesy Furst-McNess Co.



Working can cover with feed opening optional at extra cost.

FAST....
THOROUGH...
TROUBLE-FREE

DAY Gearless Type Pony Mixers are known throughout the industrial world for efficient, dependable operation. Here are the reasons: The one-piece cast head is perfectly counter-balanced for effortless tilting. Planetary mixing action with anti-thrust agitator blades effects a rapid, thorough mix. Absolute rigidity is assured by a one-piece casting for the main frame. A single geared head motor drives both agitator and can gear; single or two-speed motor optional. Stainless steel agitator blades, scrapers and cans available at extra cost. Working capacities from 40 to 125 gallons.

DAY

THE J. H. DAY COMPANY, CINCINNATI 22, OHIO
INCORPORATED

product in non-rigid containers—can, together with moisture evaporation, materially accelerate caking. Pressure reduces voids between finely divided particles and increases area of contact among them. Sufficient pressure alone can cause caking.

Pressure-caking can be avoided two ways—by packing in small, rigid containers or by producing a product with large, uniform particles.

Ideal way is to pack a moisture-free product into an hermetically sealed can in a room with a relative humidity of 0 percent.

Since this method is too costly to be practical, look into these suggested ways of preventing moisture-caking—probably the major one giving you trouble:

1. Manufacture a product with as low a moisture content as practical, with large and uniform particles, and with a minimum of soluble impurities that reduce product's equilibrium relative humidity. Large particles do not dissolve as readily as fine ones. And products with a high equilibrium relative humidity do not readily pick up moisture.
2. Add an inert material—for example, starch to powdered sugar.
3. Agitate product during drying to break it up, and then cool it. Never pack a product hot.
4. Pack product into airtight containers in a dry room.
5. Use a moisture-vapor proof package to prevent subsequent access of moisture into product.

Cherries Turn Dark

Question—Last fall we put up our first pack of maraschino cherries. Within a very short time they darkened so sufficiently as to be unappetizing. It was necessary to remove cherries from jars and restore their bright color by adding sulphur dioxide. Have you any suggestions on how we can avoid this difficulty this fall?

Answer—There are three factors that may have brought about discoloration of cherries—heavy metals such as copper and iron, tannin complexes, and oxygen from the air.

As little as 5 ppm. of copper picked up from equipment will darken dye and cherries, while presence of 25 ppm. will blacken the fruit. Iron and copper can be removed by heating cherries in a 50 percent syrup with 0.2 percent calcium phytate at a pH of 3.0.

Another approach, as you well know, is to add sulphurous acid—15 lb.—of acid containing 6 percent SO_2 to each 100 lb. of fruit just before last syruping. Final boiling will remove SO_2. The SO_2 reduces tannin or

metal-tannin complexes. Provided that air does not get to the cherries, they will remain a bright color.

Darkening can also be prevented by avoiding contamination of the cherries with tannin from barrels.

Controlling Dressing Spoilage

Question—We've been running into a serious problem—our Thousand Island dressing darkens and shows evidence of oil separation. Can you tell us the cause and how this difficulty may be overcome? Our product consists of corn oil, vinegar, sugar, egg yolks, pepper, mustard, paprika, pickles, olives, and chili sauce. Acidity of product (expressed as acetic) is 0.8-0.9 percent.

Answer — Researchers have traced type of spoilage referred to a spore-forming organism found in spices.

It is our suggestion that you follow two courses: (1) Use sterilized spices and (2) make product sufficiently acid to prevent growth of this spoilage organism. Acidity of the product should be between 1.25–1.50 percent.

Wants a Nougat Formula

Question—Please furnish me with a formula and details on manufacture of a chewy type nougat containing honey and nuts.

Answer—You might try this formula: Sugar, 20 lb.; corn syrup, 20 lb.; nuts, 13 lb.; honey, 10 lb.; hard coconut butter, 1 lb.; water, 7½ lb.; albumin, ¾ lb.; and vanilla flavor, enough to suit taste.

Now to preparing nougat: Melt honey in a kettle and introduce it to a beater-type mixer. Meanwhile, dissolve albumin in about 1½ lb. of cold water, and beat it with the honey until mixture is light.

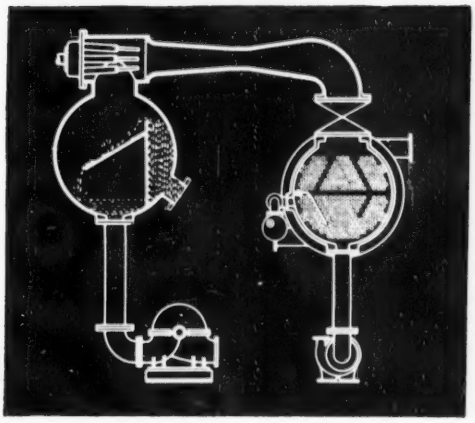
Heat the sugar, corn syrup, and remaining water to 268 deg. F. Now, pour the hot syrup in a fine stream into the whipped honey-albumin batch and mix well. Add the coconut butter, nuts, and flavor. (Use about 75 percent chopped nuts and the remainder sliced nuts.)

After the batch is well mixed, pour it onto an oiled slab to cool. Then cut into pieces of desired size.

Air Pollution Problem

Question—We operate a cannery in a village, located in a predominantly agricultural area. Our main boiler is a fire-tube unit fired by pulverized bituminous coal. We also operate one or two hand-fired fire-tube boilers when needed. Recently, we have been re-

Water cools itself with a C-R Chill-Vactor



A Chill-Vactor is a three-stage steam-jet vacuum unit which serves to flash-cool water and certain other liquids through temperatures down to 32° F. No chemical refrigerant is used. There are no moving parts. Water literally "cools itself" by partial evaporation at high vacuum. Vacuum refrigeration is usually less expensive than mechanical refrigeration in first cost as well as operating cost.

Chill-Vactors are producing chilled water in industrial plants throughout the world. They are cooling chemical solutions, fruit juices, milk, whiskey mash, etc. Bread and other baked goods have been vacuum cooled successfully for years. Other products, such as lettuce, spinach, celery and other leafy vegetables, are being cooled to temperatures around 33° F. in quantities up to 200 cars a day.

The Chill-Vactor is only one type of steam-jet evactor manufactured by Croll-Reynolds. Let our technical staff help you with any or all of your vacuum problems.

CROLL-REYNOLDS

CROLL-REYNOLDS CO., INC.

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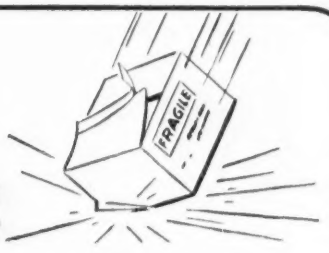

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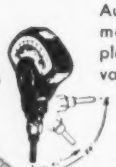

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ceiving complaints from local residents against smoke, soot, and ash, and it looks as it we will have to make some improvements in our boiler room. Have you any suggestions to offer on steps we could take to eliminate the troublesome conditions at low cost?

Answer—Your situation is by no means unique. People today just will not tolerate atmospheric pollution that they considered normal and unavoidable only a few years ago. You are certainly right to consider early improvements to retain the good will of the townspeople.

Very often, in cases of this sort, it will be found upon analyzing operations that bulk of dirt discharged from stack is caused by "blowing the tubes." Certainly ash and soot deposits must be periodically removed from tubes to maintain satisfactory heat transfer rates within boilers, but it is not necessary to blow this material into the atmosphere deliberately.

We suggest that your first step should be to obtain an industrial-type vacuum cleaner with suitable attachments and install it in or alongside the boiler room where it can be used to remove tube deposits and collect them in a suitable metal container.

You may be agreeably surprised to find an extra dividend in a much cleaner boiler room in general, as the vacuum cleaner can be used to clean up coal dust. This is always an advantage in a food plant which has sanitation of its environs to consider.

Other measures which can be put into effect with little extra cost are:

1. Make sure that your coal pulverizer is maintained in proper condition. This calls for a thorough inspection of the pulverizer and replacement of all excessively worn parts. The manufacturer will undoubtedly cooperate with you on this, possibly to the extent of analyzing a sample of pulverized fuel to be sure it is of proper fineness.

2. Make certain, too, that coal is of suitable "grindability" and of as low an ash content as practical.

3. For the hand-fired boilers, consider use of so-called "smokeless" fuel. (Consult your fuel supplier for specifications on percent volatile.)

4. Spray your coal pile at intervals to minimize wind-borne coal dust. (This again is to your own advantage, sanitation-wise.) A wetting agent may be helpful to secure good results.

5. Finally, have someone in your organization responsible for making frequent observations of stack conditions (Ringleman charts may be helpful) together with wind-direction and other pertinent weather data. A log of this material may come in handy later as proof of the improvements that have been made.

Because of your stipulation of "low cost" measures, we have not discussed installation of mechanical or electrical dust collectors or substitution of fuel oil firing for coal. These measures might eventually be required to meet local ordinances but should not be adopted until above have been given fair trial.

Trouble With "Weepy" Filling

Question—In experimental preparation of fruit-pie fillings put up in wooden pails, weeping or syneresis (watering) takes place in about two weeks. Starch is employed as thickening agent. Can you provide me with a solution to this problem?

Answer—During normal cooking of a starch-type fruit pie filling, starch granules will absorb water as they swell, and then retain it. If, however, starch is undercooked, water is loosely held by granules. As a result, water is easily released following cooling and aging—a condition that is accelerated whenever fruit-pie fillings are held at low temperatures in refrigerators or cold-storage rooms.

Root starches (arrowroot) cook more readily and retain water better than flours or cereal-type starches. Weeping can be reduced by using a combination of cereal and root starches. You might investigate possibility of using amioca starch—an effective stabilizer produced from waxy maize.

About Dressing Emulsifiers

Question—Please furnish me with a complete list of emulsifiers that I might try in developing a formula for French Dressing.

Answer—Emulsifiers that you may wish to try include: Extract of Irish moss, pectin, sodium alginate, propylene glycol ester of alginic acid, sodium carboxymethyl-cellulose, and the gums guar, acacia, carob bean, karaya, and tragacanth. You might also look into possibility of using mixtures of these emulsifiers.

Wants to Conserve Water

Question—Water is becoming scarce in the area in which our cannery is located, and it is necessary that we do everything within reason to conserve it in our operations. Can you give us some suggestions on how this may be accomplished?

Answer—A thorough survey of your present water usage is a good starting point. Determine main water-consuming operations with meters. In this way you will be in a position to con-

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on every food handling operation with

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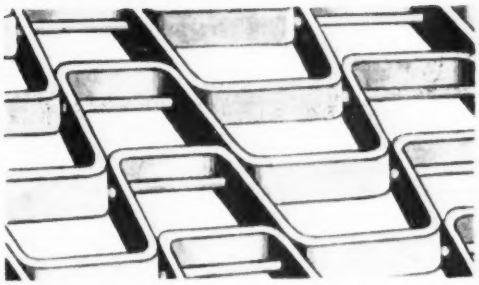

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centrate your efforts for greatest results. You will also be able to establish a norm against which future water savings can be measured if it becomes necessary to demonstrate your cooperation to authorities having jurisdiction over water conservation.

Your survey will suggest many possible water-saving measures, such as:

1. Washing and fluming raw materials. Try to reuse final wash water for preliminary washing and conveying. Water usually will be clean enough for such reuse. Of course, fresh water will still be needed for final washing.

2. Canned goods cooling. By switching from canal to spin-cooling, you may save considerable water, since latter method removes more heat per pound of water by using latent heat of vaporization. If your product cannot stand spinning, try spraying water on hot cans ahead of canal to accomplish same result on a more limited basis. In canal itself, water may be re-circulated by pump with only enough make-up added to control final temperature. In fact, circuit can include a cooling tower with still further reduction in make-up. See if you can use warm canal overflow for preliminary washing, or in cleanup.

3. Miscellaneous. Thermostatic controls on cooling water systems for air-compressors and refrigeration compressors will yield big water-saving dividends. Automatic shut-off valves on hoses, reminder signs at usage points, and like will help. If you have your own well, consider feasibility of returning waste water to ground. But be sure to determine regulations governing such installations and fully comply with them.

Has Waste Disposal Problem

Question—In the course of manufacturing a complete line of salads—potato, macaroni, fruit in gelatin, and cole slaw—we have a considerable amount of fruit and vegetable trimmings that must be disposed. At present, this waste is collected in garbage cans and later picked up in trucks and disposed. Is there some way we can grind this refuse and flush it into the sewer system?

Answer—You are foresighted in thinking of an immediate method of disposing of your waste. Holding refuse in garbage pails will attract flies and the decomposing material gives rise to offensive odors in your plant.

If you have a sufficiently large operation, we suggest that you purchase a hammermill for pulverizing refuse. It would be wise to install a permanent magnet at discharge of the hammermill. Purpose is to remove nails, pieces of wire, and other metal from the waste, to avoid a clogged pipe.

To sluice mashed refuse into sewer, install a water hose at the hammermill discharge. For conservation purposes, use water employed to wash and rinse fruits and vegetables.

—End—

Wire Belt Conveyors

—Continued from page 73

when applied to the slack return by shifting a snub, satisfactory results may also be obtained by changing angle of support rollers on either or both surfaces of belt. Latter method enjoys the advantage of deflecting without increasing tension.

Once aligned and adjusted, a belt should then be run a minimum of several hours to insure proper seating of every spiral. It may even be necessary to realign at the end of this run, since loading an improperly adjusted belt invites early and constant repairs and also premature failure. Trouble is likewise invited if belt is not kept clean.

On all oven conveyors, stationary scrapers should be installed to free belt of burned dough. In the case of belts in contact with powdery material, brushes (preferably mechanical), should be added to sweep belt surfaces clean.

Live steam is a reliable aid in cleaning. It will defrost a belt at freezing temperatures or sterilize one at room heat—both without ill effect on belt.

Though correctly aligned before loading a belt may become misaligned at any time. Therefore frequent check-ups will pay. And, when adjustments are indicated, corrections should be made without delay. To be checked every time are—

1. Cleaning devices. Do they clean without injury to belt?

2. All conveyor parts that contact belt. Do they function as intended?

3. Belt surface. Are any spirals or connectors bent or broken? Does selvage indicate wear?

4. Alignment.

Don't pass up even minor repairs. And in addition here are a few tips—apply them for belt longevity:

1. Maintain slack return at all times, then belt travel will be easier to control.

2. Load belt evenly across entire width, thus avoid strains and belt distortion.

3. Reverse belt if contact surface of pulley becomes worn, and thereby prolong belt life.

End *(Resume reading on page 74)*

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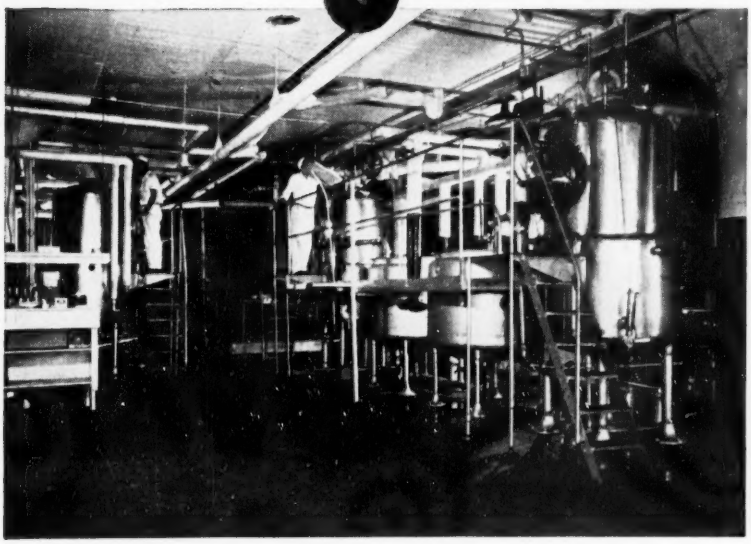

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Useful New Books & Government Publications

For Dairy Chemists

RICHMOND'S DAIRY CHEMISTRY. *Fifth Edition. Revised by J. G. Davis and F. J. Macdonald. Published by Charles Griffin & Co., Ltd., 42 Drury Lane, London WC2.* 1953. *603 pages; 6x9 in., cloth. Price* 60s., *Postage* 1s.6d.

Since the first edition, published in 1899, Richmond's has long been recognized by dairy and food chemists as an outstanding book giving essential information on chemistry of milk and dairy products.

This new edition retains material of permanent value contained in previous editions, including more than 200 tables of standard analytical methods. In addition, complete up-to-date information on most recent research developments, new processes, and official methods evolved in recent years has been added.

Though mainly a working handbook for chemists dealing with dairy products, volume also deals with bacteriological tests, nutritive values, and other subjects, of interest to all concerned with chemical control work in dairy or general food industries.

Enzymology Progress

ADVANCES IN ENZYMOLOGY. *Volume XIV. Edited by F. F. Nord. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York* 1. 1953. *470 pages; 6¼x9¼ in., cloth. Price* $9.25.

In ten chapters, 12 noted American and European scientists present extensive discussion on recent advances in enzymology and related subjects in biochemistry. Each chapter is exclusively devoted to the findings and studies of a different authority, except for chapters II and X which are each written by two authors.

The whole field of enzymology is comprehensively and graphically covered. Complete references are given at the conclusion of each chapter. A subject and authors' index as well as a cumulative index of Volumes I to XIV are included at the end of the volume.

Refrigeration History

REFRIGERATION IN AMERICA. *By Oscar E. Anderson, Jr. Published by Princeton University Press, Princeton, N. J.* 1953. *344 pages; 5¾x8¾ in., cloth. Price* $6.00.

Sub-titled, "A History of a New Technology and Its Impact", volume covers history of refrigeration industry from 1750 to 1950, shows relation of refrigeration to our national development, records main trends in technological progress, describes uses of refrigeration, explains resistance to its application, and gives some indication of its social effects.

Extent of research done in preparation of book is evidenced by voluminous footnotes and the bibliographical note at the end of book. Indexed.

Author is professor of history at University of Cincinnati.

Plant Waste

INDUSTRIAL WASTES, THEIR DISPOSAL AND TREATMENT. *Edited by William Rudolfs. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York* 36, 1953. *497 pages; 6¼x9¼ in., paper.* Price $9.50.

Another in a series of chemical monographs, book offers a comprehensive study of physical, chemical and biological problems of waste disposal in various industries.

Specific chapters deal with treatment in dairy, canning, fermentation, meat packing plants, and corn starch processes.

Waste treatment in general, basic principles of stream pollution and self-purification are discussed. Attention is also given to volumes and characteristics of wastes and recovery of by-products.

Each chapter is concluded with a list of ready references. Indexed.

Editor is chairman of New Jersey Agricultural Station's department of sanitation at Rutgers university.

Processing Equipment

CHEMICAL PROCESS MACHINERY. *Second Edition. By E. Raymond Riegel. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York* 36. 1953. *735 pages; 6¼x9¼ in., cloth. Price* $12.50.

This is a comprehensive book on the latest developments in the equipment of the chemical and process industries. This edition follows the first in its organization of subject matter but has been considerably enlarged and covers the latest developments.

Only equipment commercially available is discussed. Equipment is classified by function giving a natural and logical flow to the contents. For each group of related devices, a classification in tabular form is offered. It is profusely illustrated with diagrams, photographs, and tables, there being 597 illustrations and over 92 tables.

New devices such as multispheres and multicylinders, high-speed centrifugal separators, and other new or greatly improved equipment including P-A cyclonic spray tower, P-A Venturi scrubber, continuous crystallizers, absorption refrigerators, molecular still, and the turbo-drier, are well described and illustrated.

Brand new descriptive material on distillation, mixing of liquids, control instruments, as well as expanded descriptions of evaporators, driers, heating and cooling equipment, and pumps, are included.

Volume is of particular value for those who wish to select and utilize machines best suited to their particular requirements.

Appendix contains important conversion tables, chemical symbols and steam temperature tables. Indexed.

Government Publications

REPORT OF THE AGRICULTURAL EXPERIMENT STATIONS, 1952. *USADA,* 150 *pages. Price* 40¢ Summarizes many new developments in the research program of the State Agricultural Experiment Stations during fiscal year ending June 30, 1952.

CAR-LOT SHIPMENTS OF FRESH FRUITS AND VEGETABLES BY COMMODITIES, STATES, AND MONTHS, INCLUDING BOAT SHIPMENTS CONVERTED TO CAR-LOT EQUIVALENTS, CALENDAR YEAR 1952. *USDA, Production and Marketing Administration, April* 1953. 22 *pages.* Annual summary of movements of fruits and vegetables.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

MARKETS AFTER THE DEFENSE EXPANSION. *U. S. Dept. of Commerce.* 90 *pages.* 55¢. Designed to inform the business community on factors affecting level of civilian demand after the present defense program has reached its peak.

MILK ORDINANCE AND CODE—1953 RECOMMENDATIONS OF THE PUBLIC HEALTH SERVICE. 242 *pages.* 75c. First complete revision since 1939. *Prepared by U. S. Public Health Service, endorsed by USDA.*

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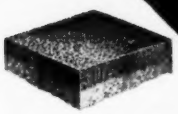

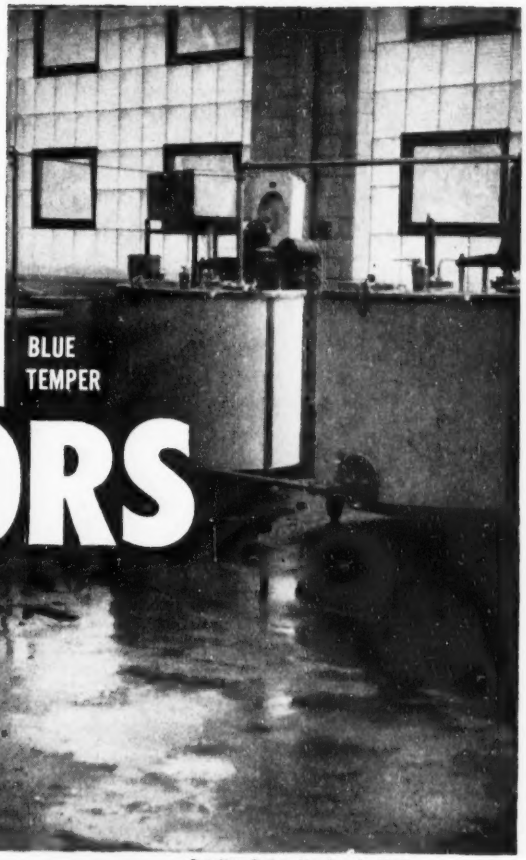

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

R.H. Up—H.R. Up

Humidifying of the air in aspirators, elevators, or the milling room to 70-80 percent relative humidity raises yield of head rice (whole, unbroken grains) as much as 6 percent above that at lower humidities. This has been determined in pilot-plant research at the University of Arkansas' Institute of Science & Technology, working under USDA contract. The studies indicated that where humidification of the entire milling room or of elevators is not feasible or economical, upping the r.h. of the aspirators becomes most pertinent.

Gluten Aids Poor Flour

Addition of as little as 6 percent gluten powder to flours from low protein wheats has been found of great value in improving their baking qualities.

Technique for producing the gluten powder was developed by Wallace B. McConnell, Prairie Regional Laboratory, Saskatoon, Canada. In the process, gluten is extracted from flour and dispersed in a dilute solution of weak acid. Dispersion is then spray dried and gluten is collected as a fine powder.

OK Candy Antioxidants

F&DA has given specific approval of three chemical antioxidants for candy-making – BHA; a mixture of BHA, propyl gallate, and citric acid; and a mixture of propyl gallate, citric acid, and agricultural antioxidants.

But they have reserved decision regarding NDGA, a largely used antioxidant for animal fats.

With reference to the latter, FDA Administrator Crawford holds that insufficient evidence had been presented as to its toxicity.

G. Rays Harm Milk

Irradiation of milk and other dairy products with gamma rays adequate to produce sterility brings about severe losses of nutritive value, according to researchers at Columbia University.

They found that when milk was exposed to the rays for 6 hr., 70 percent of its vitamin A, 37 percent riboflavin, and 100 percent ascorbic acid were lost.

Chemical Emulsifiers Not Yet "Safe"

Basing its conclusions in part on recent and unpublished work of FDA, the Food Protective Committee of National Research Council concludes that "available data fail to demonstrate the polyoxyethylene stearate is safe for use in foods under all patterns of dietary consumption and for all segments of the population."

Scheduled for release late in July, the report supplements the FPC report, "The Safety of Mono- and Diglycerides for Use as Intentional Additives in Foods," released last December.

Additional work is known to be in progress in various laboratories. Modified conclusions may, therefore, be anticipated at some future date. However, it is premature to know whether modifications will be in the direction of "safe" or "toxic." It is also possible, of course, that the answer may be "indeterminate" even after further work.

Following is the full text of conclusions in the July 27 release:

The additional evidence available on polyoxyethylene stearates since this Committee's statement, "The Use of Surface Active Agents in Food," dated Nov. 9, 1951, has been reviewed by the Food Protective Committee in light of its Statement of Basic Principles.

No new food additive should be introduced for human consumption or continued in use in the diet as long as a reasonable doubt remains concerning its safety. The potential toxicologic hazard in the incorporation of polyoxyethylene stearates into foods in technologically desirable quantities may not be great. Nevertheless, the experimental studies in the biologic behavior of polyoxyethylene stearate indicate a number of unfavorable reactions. The possibility of these outweighs the arguments advanced to support its use.

There is no available evidence bearing upon the susceptibility to injury of subjects at advanced age or with pre-existing pathology of the genito-urinary tract or the liver. The data, therefore, cannot be related to the possibility of injury to individuals in the older age groups or to persons with impaired renal or liver function.

In light of the above considerations, this Committee can only conclude that the presently available data fail to demonstrate that polyoxethylene stearate is safe for use in foods under all patterns of dietary consumption and for all segments of the population.

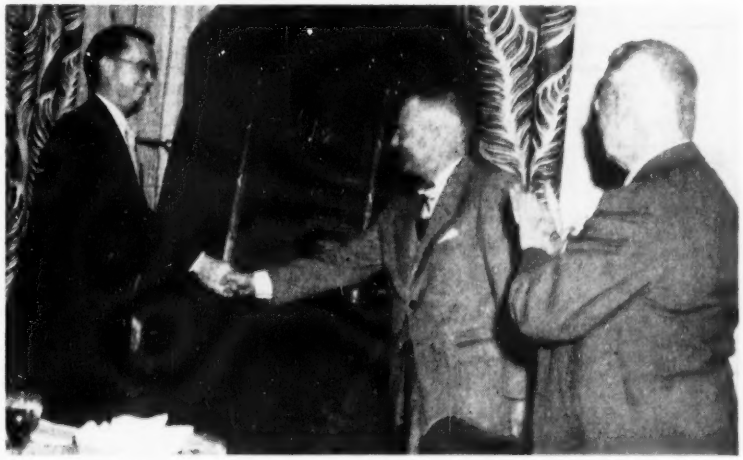
These are the principal references on which the conclusions have been based:

(1) Division of Pharmacology, FDA, 1952 report (unpublished). *Studies on the Chronic Toxicity of Polyoxyethylene (8) Monostearate (Myrj 45).*

(2) Eagle and Poling, Swift & Co., undated report (unpublished). *Oral Toxicity and Pathology of Polyoxyethylene Derivatives in Rats and Hamsters.*

(3) Schweigert, McBride, and Carlson. *Proc. Soc. Exper. Biol. & Med.*, 73, 427 (1950). "Effect of Feeding Polyoxyethylene Monostearates on Growth Rate and Gross Pathology of Weanling Hamsters."

(4) Wang, McBride, and Schweigert. *Proc. Soc. Exper. Biol. & Med.* 75, 342 (1950).



Smiles and Applause Go to Award Winner

L. W. Murphy, Geo. A. Hormel & Co. (center), receives 1953 FOOD ENGINEERING award plaque from smiling giver, Editor F. K. Lawler (left). Dr. Samuel Cate Prescott, MIT, Award Committee Chairman, applauds. Hormel was selected by an IFT jury for development of its process of immobilizing hogs with carbon dioxide gas prior to slaughter. Presentation was at annual IFT meeting.

Congress Passes Plant-Inspection Bill

Bill to permit FDA inspectors to enter plants without warrants or owners' permission was passed by the House July 16 and the Senate Aug. 3.

This legislation had been put underway following a Supreme Court ruling that such power was not distinct in the original Act.

The present bill makes it a Federal offense for a plant to bar inspectors. However, it does not permit their entry by force. Plant owners could be fined $1,000 or sentenced to 1 year in prison for refusing an inspector's entry. Proof of fraud or moves to mislead could raise the figures to $10,000 or 3 years.

Under the bill, inspectors have to file written reports of their findings with plant owners prior to leaving. In addition, they must apprise owners concerning samples taken and report to them results of any on-the-spot analyses.

After several weeks of earlier debate, the House Committee on Interstate & Foreign Commerce had issued a majority report favoring "reasonable" inspection without securing permission of owner, operator, or agent in charge. The enforceable inspection power granted by the bill was termed "necessary and proper" (1) to control fringe and racketeer type operators, (2) to avoid placing responsible operators at a competitive disadvantage, and (3) to provide the least onerous type of inspection.

Thirty federal laws were cited to show that inspection powers are neither unprecedented nor unduly stringent. The search-warrant procedure was called inappropriate.

The Constitutional question was discussed at some length in the report, with over seven pages of citation in the appendixes.

Minority views were expressed by three of the Committee (total membership is 31), including O'Hara (R., Minn.), Williams (D., Miss.), and Warburton (R., Del.).

After pointing out that effective control under the FDC Act has been possible with permissive inspection, this group based its Constitutional question on the distinction between inspecting "manufacturing operations" and inspecting "interstate commerce".

The minority suggestion to restore FDA effectiveness proposed continued permissive inspection, with a provision that "in the event of refusal to permit entry or inspection, officers or employees duly designated by the Secretary are authorized to apply for a search warrant or other appropriate writ, and the district courts of the United States and the United States courts of the Territories shall have jurisdiction for cause shown to issue such warrant or other order to compel inspection according to the provisions of Section 704".

"Histological Manifestations of feeding Polyoxyethylene Monostearates to Weanling Hamsters."

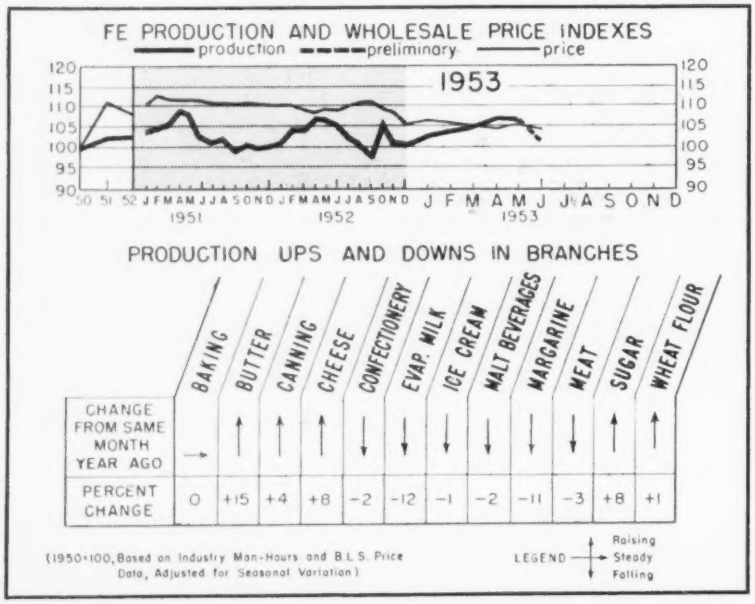
(5) E. M. Nelson, FDA, Communications to the Food Protection Committee, Oct. 15, 1952, Feb. 15, 1953, and Apr. 3, 1953. Studies on Myrj 45.

Yearly Climb of Foods

Figures compiled by McGraw-Hill Dept. of Economics show following average annual increases in output between 1940 and 1951 (percent): Frozen food 17.5, canned fruit juices 12, margarine 11.3, canned fruits 5.3, and ice cream 5.2.

Antibiotics vs. Bacteria

Organisms in milk that are capable of surviving pasteurization are inhibited by penicillin, streptomycin, and aureomycin. But in raw milk, very little effect is produced by addition of these antibiotics, according to results at Ohio State University.



Aureo, Oleo, and C. Rays For Better Meats, Fish

Special attention was given by IFT'ers, at the recent meeting in Boston, to questions of treating meats with antibiotics, marbling of beef, and controlling spoilage of fish.

A 2-ppm. infusion of aureomycin into fresh meats enabled them to withstand spoilage for 48 hr. without refrigeration, according to H. H. Weiser, H. S. Goldberg, P. R. Cahill, L. E. Kunkle, and F. E. Deatherage, of Ohio State University.

An improved method for inducing marbling (improving meat tenderness) by mechanically introducing 120 to 130 deg. F. oleo stock under a pressure of 20 to 25 psi. into the vascular system of beef was reported by E. G. Shee, I. S. Meyers, M. Rarick, and R. E. Morse, Kingan & Co., Indianapolis. Uniform results were not obtained, however, due to vascular damage attributed to standard packinghouse practices.

Possibility of irradiating fresh fish fillets with supervoltage cathode rays to slow down the growth of surface bacteria and thus prolong the refrigerated shelf-life of fish was pointed out by B. E. Proctor and J. T. R. Nickerson, of MIT. Incidentally, MIT has in pilot-plant operation for the Navy a similar application for extending refrigerated shelf-life of fresh meats.

New Head Lettuces

Two lettuce varieties, each suited to a special area and season, have been developed by USDA. One is named Alaska because it does well in that territory. The other, Jade, shows special promise as a fall crop in irrigated valleys of the Southwest. Its most valuable trait is resistance to cold.

IFT for Simpler Way

Streamlining of procedures governing establishment of food standards, through amendment of Sections 401 and 701 of the Food, Drug & Cosmetic Act, has been endorsed by the Institute of Food Technologists in a letter addressed to Hon. Charles A. Wolverton, chairman, Interstate & Foreign Commerce Committee, House of Representatives.

Referring to House bill 5055, the IFT communication specifically stated that the Institute wished "to go on record as favoring the principle of simplification of procedures . . . and the issuance or amendment of food standards without hearings in cases in which no protest arises following due public announcement of such proposals."

Hors d'Oeuvres

▶ FDA got tough recently when the inspectors found pigeons in a Midwestern food plant. The birds were not housebroken.

▶ **Further improvement in canned foods through high-short sterilization will bring a new advantage in competition with frozen foods. Progress is a two-edge sword.**

▶ California researchers have proved that Port wine does not cause gout. We knew all along that it went to the head, not the feet.

▶ **North Dakota's Senate passed a bill banning candy cigarettes. Doesn't want to encourage juvenile smoking. Better kick out the bubble pipes, maybe?**

▶ Home economists are advising housewives to make jams from frozen fruits in off-season. 'Tis easier to let food processors make it.

▶ **Food sanitarians say that you can drive bats out of cold storage rooms with carbon dioxide. But how does one get the bats out of his belfry?**

▶ Cuba reduced the size of sugar sacks from 325 to 250 lb. to make them easy to handle. Who's kidding whom?

▶ Scientists believe that Nature conceived man's existence on a much grander plane than he has yet discovered. Does seem strange that something requiring two decades to build should fall apart so soon.

▶ **Tiny nitrogen-filled plastic "microballs" are used to form a floating protective blanket on petroleum. Just the thing to keep the soup hot.**

▶ 'Tis reported that hasty breakfasts cost 166 man-hours of energy per day per 1,000 employees. But leisurely breakfasts would cost 1,000 man-hours.

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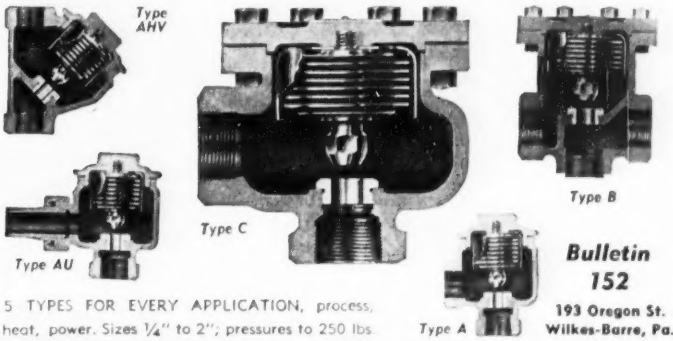
Nicholson Steam Traps

CUT HEAT-UP TIME 48%

A large processor recently reduced the heating cycles of cookers from 105 min. to 50-60 min., by substituting Nicholson thermostatic steam traps for a mechanical type. This effected a gratifying production increase of 37%. Reasons for Nicholson's faster heat transfer: operate on lowest temperature differential; 2 to 6 times average drainage capacity; maximum air venting. To learn why an increasing number of leading plants are standardizing on Nicholson thermostatic traps send for our catalog.



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20-Point FDA-PMA Cooperation

Memorandum of agreement recently signed by FDA and Production & Marketing Administration outlines a streamlined program of cooperation by the two agencies in food product inspection and various standardization activities.

Accordingly, PMA will: (1) Supply FDA with a list of all plants operating under PMA inspection or grading contracts. Type of service will be set forth, and changes will be advised.

(2) Investigate reports from FDA re processors who have not corrected objectionable conditions found to exist by FDA, and take appropriate action.

(3) Decline to inspect or grade samples of products seized by FDA or known to be involved in formal FDA actions. This does not preclude PMA's reinspection of legally authorized samples previously inspected or graded by PMA.

(4) Assign to products grade or government legends only on bases of wholesomeness factors normal to the product, except in cases of limited inspections, wherein the certificates will cite the limitations.

(5) Furnish FDA, on request, information on determinations relative to specific lots of products, inspected or graded by PMA, that have become involved in FDA action.

(6) Report on inspection certificates any pertinent codes or other marks that will serve to identify specific goods.

(7) Inform FDA whenever it has information relative to subpoena-ing of an employee or USDA inspector as witness at judicial proceedings involving FDA actions, and advise nature of proposed testimony.

In turn, FDA will: (1) Invite PMA inspectors, at plants under PMA inspection, to accompany FDA inspectors during their checks of such plants. The FDA inspectors will point out to the former conditions noted that may result in FD&CA violations.

(2) Request PMA for any pertinent information relative to determinations on specific lots of goods involved in FDA action and believed to have been inspected by PMA. Here, FDA will take into consideration all PMA data when deciding on further steps.

(3) Advise PMA immediately of all seizures by FDA of food products in order that this information on plants and products may be made known to PMA inspectors.

(4) Immediately notify PMA in writing on details of serious objectionable conditions found by FDA in plants currently under PMA inspection, or other plants when the information would appear pertinent to PMA activities.

(5) Mark, wherever possible, a claimant's samples of seized products in such manner that PMA representatives will recognize such post-seizure samples.

(6) Discuss with PMA the criteria used by FDA, in order that there will be maximum assurance PMA does not classify as acceptable a food FDA would consider actionable.

(7) On request of PMA will review official labels and other marks for goods under PMA inspection, to guard against possible conflict with misbranding provisions of FD&CA.

Further, it is mutually agreed: (1) Field offices of both the agencies will maintain close working relations.

(2) Proposed regulations by either agency on standards will be referred to other for review and comments, except amendments to PMA grade standards that do not modify any of minimum quality factors contained in standards previously referred to FDA for its review.

(3) Both agencies will work with industry toward greater efficiency in improving coding methods.

(4) Both will cooperate in handling cases of misbranding that also come under the Perishables Agricultural Commodities Act of 1930, as amended.

(5) Nothing in the agreement modifies previous agreements setting forth procedures concerning plugged cars of wheat or wheat deemed unfit for mixing.

(6) Any of above provisions may be modified at any time by mutual agreement.

Dedicated to Research

Built with funds donated by Campbell Soup Co., MIT's great new food research building was formally dedicated on June 24, following IFT meeting in Boston. Hundreds of food technologists visited this John Thompson Dorrance Building and attended the dedication ceremonies. Among them, FE camera caught Lloyd A. Hall (left), technical director of Griffith Laboratories, and Milton E. Parker, director and professor of food engineering, Illinois Institute of Technology.

Soft-Drink Technologists Form Organization

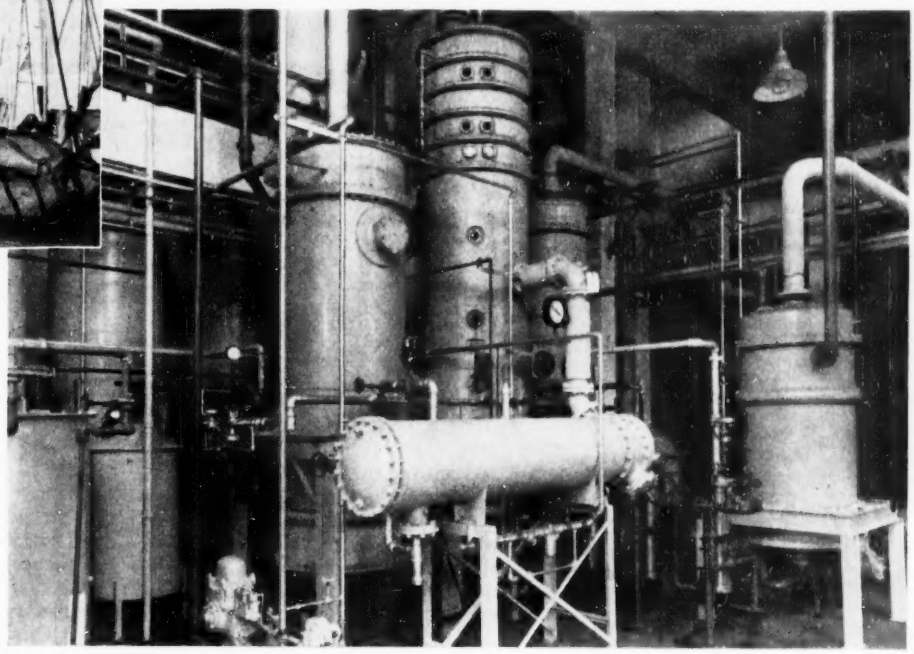
The soft-drink field now has a society of technologists, with 47 members, a tentative constitution, and a complete slate of officers and directors.

Objectives: To develop and disseminate knowledge of soft-drink production and utilization, on a non-profit, professional basis; to promote discussion of key matters; to study problems; and to encourage research.

Membership is open to any person actively engaged in scientific, or technical phases of production, research, or control.

Photo shows eight of nine on board. Seated (l. to r.): John Sharf, Armstrong Cork Co., first vice-president; Joseph Hale, Nehi Corp., president; Harry E. Korab, ABCB, secretary-treasurer. Standing: J. T. Skinner, The Grapette Co.; W. E. Dimmock, National NuGrape Co.; A. J. Granata, Pure Carbonic Co.; W. S. Cooper, Geo. G. Meyer Mfg. Co.; and Pannill Martin, Cloverdale Spring Co. Not present: Stephen J. Gullo, Pepsi-Cola Co.

Spice Shipments are not always the same...



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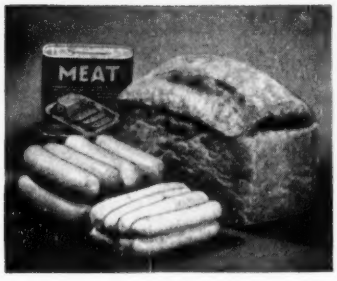

Pepperoyal is no ordinary soluble pepper. Use the same amount of Pepperoyal in every batch of your product, and every batch will smack of the same pure pepper flavor.

True, it is processed from prime quality pepper berries. But, its real quality distinction originates in the Griffith laboratories. The potency, purity and uniformity of pepper flavor in Pepperoyal is controlled by our exclusive process of extraction.* It assures you of the same flavor quality in every shipment of Pepperoyal, or any of Griffith's Solublized Seasonings.

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Schedule of Events

August

10–13—International Apple Assn. annual meeting; Chicago.

10–14—Conference on Food & Nutrition (Amer. Assn. for Advancement of Science); Colby Junior College, New London, N. H.

24–26—Canadian Institute of Sanitary Inspectors Dominion Convention; Vancouver, B. C.

September

1–3—International Assn. of Milk & Food Sanitarians; Michigan State College, East Lansing.

15—American Assn. of Candy Technologists, Sanitation Seminar; Penn-Sheraton Hotel, Philadelphia.

16–18—Dairy Products Institute; University of Minnesota, St. Paul campus.

October

1–2—American Butter Institute, annual meeting; Hotel Morrison, Chicago.

2–4—National Poultry, Butter & Egg Assn.; Chicago.

2–6—American Meat Institute, annual meeting; Palmer House, Chicago.

10–17—International Dairy Show (Chicago Farmers Club); International Amphitheater, Chicago.

11–13—Brewers' Assn. of America, annual convention & exhibit; Edgewater Beach Hotel, Chicago.

12–14—Packaging Institute, annual forum; Hotel Statler, New York City.

18–20—National Pretzel Bakers Institute; Claridge Hotel, Atlantic City, N. J.

19–23—Master Brewers Assn. of America, annual convention, and International Brewing Industries Exposition; Kiel Auditorium, St. Louis, Mo.

24–28—American Bakers Assn., annual meeting, Hotel Sherman, Chicago.

26–27—National Pickle Packers Assn., annual meeting; Drake Hotel, Chicago.

26–28—Milk Industry Foundation, convention; Sheraton Plaza Hotel, Boston.

28–30—International Assn. of Ice Cream Manufacturers, annual convention; Statler Hotel, Boston.

USDA Grade Standards

Recent actions by Production & Marketing Administration of USDA on U. S. Grade Standards and related activities include the following:

Frozen lima beans, 6th revision, p. 3431, June 16 *Federal Register*, effective July 16.

Canned lima beans, 4th revision, p. 3555, June 20 *Federal Register*, effective July 20.

Dry peas, split peas, and lentils, revised, p. 3557, June 20 *Federal Register*, effective Aug. 1.

Egg processing, minimum sanitation requirements, proposed, p. 3690, June 27 *Federal Register*, written comments received until June 27.

Canned Cream style corn, 4th revision, p. 3627, June 25 Federal Register, effective July 25.

Fresh tomatoes, revised, proposed, p. 3910, July 4 *Federal Register*, written comments received until Aug. 3.

Concentrated orange juice for manufacturing, new, proposed, p. 3912, July 4 *Federal Register*, written comments received until Aug. 3.

Canned concentrated orange juice, 2nd revision, 2nd proposal, p. 3914, July 4 *Federal Register*, written comments received until Aug. 3.

Poultry products, inspection and grading regulations, amended to add a new paragraph outlining "basis of service", p. 3994, July 9 *Federal Register*, effective Aug. 8.

Cottonseed, for crushing, amendment, proposed, p. 4010, July 9 *Federal Register*, written comments received until July 19.

Process Makes Bread Without Using Yeast

A unique method of making bread without use of yeast as a fermenting agent has recently been developed by R. W. Selman & Assoc., Kansas City, Mo.

Based on the straight-dough method, bread-flavor characteristics are obtained with an enzyme, trademarked Actigen, which is introduced with flour, salt, sugar, milk, shortening, and an oxygen releaser, Vologen.

After a short mixing time, dough goes directly to divider. It is panned without molding and proofed for about 1 hr. Proofing time, however, can be reduced to 15 min. by increasing amount of enzyme in the formula.

Novel feature is ability of process to keep the panned dough several hours after reaching full proof without any changes in quality of the bread. Loaf-volume can also be controlled by the amount of oxygen-releasing agent used. Baking seldom exceeds 18 min.

Under present FDA definitions, loaves produced by this process cannot be labeled white or milk bread, since the doughs are not yeast-leavened.

"I'd like a raise to cover your price increase to cover my last raise."

FDA Food Standards

Simplification of food standardization proceedings was scheduled to be discussed in mid-July, in the form of H.R. 5055 introduced by Representative Hale (R., Me.). At the same public hearing before the House Committee on Interstate Foreign Commerce H.R. 4277 by Representative Miller (R., Neb.) was also due to be discussed. This bill deals with pesticide residues in foods, whether or not standardized.

Imitations of standardized foods had also been on the schedule for mid-July hearings, in the form of H.R. 2739 by Representative O'Hara (R., Minn.). However, consideration of this subject and Representative Miller's bill on chemical additives in foods, and Representative Delaneys two bills pertaining to chemicals in cosmetics and foods, was postponed to some future date.

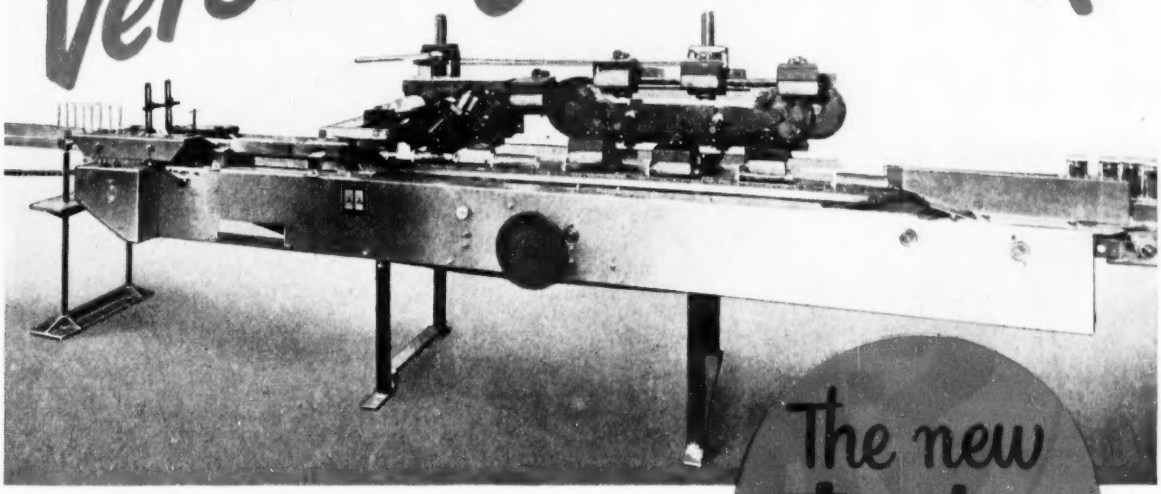
Bread standard litigation by Research Products Co. of Kansas City on the use of chemical emulsifiers came to an end on June 19. The appeal pending in the Eighth Circuit Court was dismissed at the petitioner's request. Cost of printing the record, estimated at about $10,000, was thought by some to have been the deciding factor when weighed against the chances for success after the Supreme Court denied petitions for writ of certiorari in similar cases from the Third Circuit Court of Appeals.

The *margarine* standard was upheld by the Second Circuit Court in its June 23 decision against Richard S. Reade. Important point in this decision was admission that a consumer has standing in court if he can show that he is adversely affected by a standard. In this case, however, the petition was dismissed on the merits, with citing of "substantial evidence" to support the findings.

Cheese standard amendment, requested by manufacturers in 1951 to permit skim milk cheese as an optional ingredient of process cheese food, may be broadened when hearings are announced. FDA is considering inclusion of certain wrapper ingredients, designed to prevent mold growth in storage, as optional ingredients of the cheese. Reasoning is that some of the proposed fungicides may migrate into the cheese and therefore be "ingredients" even though only incidentally present in trace quantity.

"Imitation ice cream" is the label that a district court in Syracuse, N. Y., has prescribed for a frozen dessert made with vegetable fat instead of with butter fat. At the time of writing, it was not known whether Richsert, Inc., the maker, would appeal the decision for review in a higher court.

Versatile COST CUTTER



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The many advantages it offers and its low initial cost appeal to manufacturers labeling by hand as well as to those who now have automatic labelers.

Handles a gallon jug or a 4-ounce bottle — and can be set for a given size in a few minutes. Can be fed by hand or hooked up with existing filling and capping lines.

Containers entering the machine may be hot or cold, wet or dry, without affecting the sealing. That's because a unique device applies *flexible pressure* to labels before containers are discharged.

Thermoplastic or hot melt adhesive may be used. Labels may be rectangular, round or fancy cut. Gummed and embossed labels may also be used.

CONTINUOUS MOTION
40 to 120 per minute.

STRAIGHT LINE

QUICKLY ADJUSTABLE
with few change parts.

WIDE RANGE
Gallon jug or four-ounce container — hot, cold, wet or dry.

PRESSURE SEALING
Adhesive is applied over entire surface of label and rubber rollers press it firmly on container, making a strong seal. Prevents wrinkling of label due to future expansion or contraction of container.

ACCURATE LABEL REGISTRATION
on smooth or recessed surfaces, regular or unusual shapes.

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Low initial cost, low maintenance, high operating efficiency.

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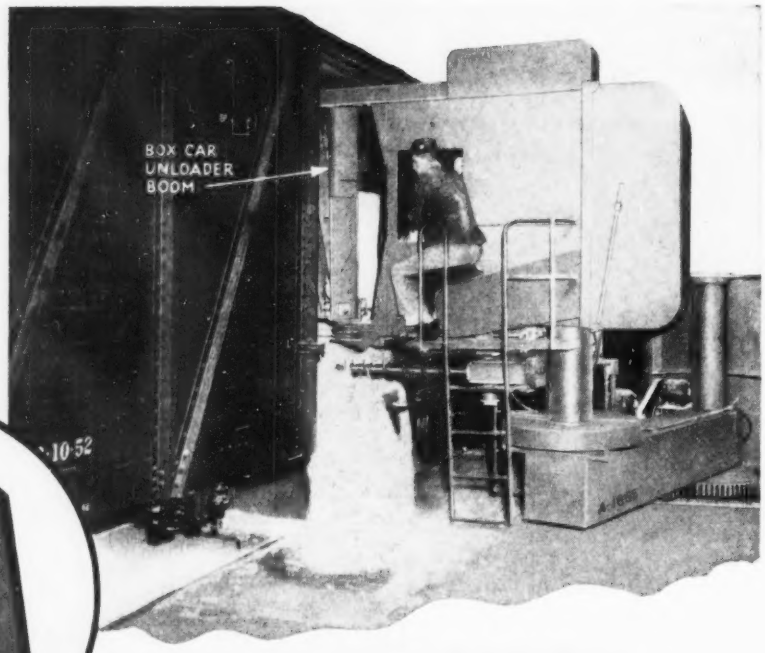

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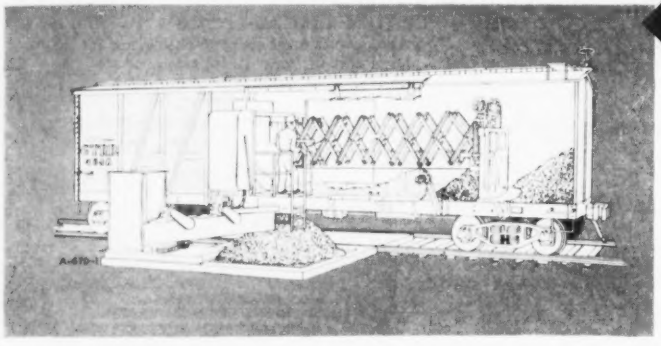
● *Same Job Used to Take 12 Hours for 7 Men and a Power Shovel*

These figures from an actual case study are merely typical of the kind of savings *many* companies are getting with S-A Box Car Unloaders. *All* of them are unloading cars faster, cheaper and with less man power! Often these units reduce unloading time to one-half man-hour per car! Equally important, they make unloading safer, because they keep the operator outside the car, away from dust hazards and protected from injury by mechanical equipment.

Costing far less than rotary or tilting car dumps, S-A Box Car Unloaders provide efficient unloading and cleaning of practically any dry or granular material normally carried in box cars. Ask to have an S-A engineer give you full facts and figures, or write for Bulletin 253.



HOW IT WORKS

The S-A Box Car Unloader is mounted at track side. Its pantograph arm and scoop extend through the door into the car. When the scoop encounters resistance from car wall or material being unloaded, it automatically drops down and digs into the material. The arm automatically retracts and pulls the loaded scoop to the door for discharge. This cycle is repeated without further attention until it is necessary to direct the scoop to another part of the car. Operator "idle" time can be used to spot cars, handle car doors or for other duties.

All controls are from outside the car! **The unit swings to unload cars on either of two tracks. When not in use, it does not interfere with normal track clearance.**

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Lactose-Reduced Concentrated Milk Product Made by Vacuum Concentrating Skim Milk and Whey in Presence of Added Sugar, Cooling, Separating Crystallized Lactose—*H. E. Otting, Westerville, and C. K. Ortman, Worthington, Ohio to M. & R. Dietetic Laboratories, Inc., Columbus. No. 2,633,424. Mar. 31, 1953.*

Egg White Composition With Improved Whipping Qualities Containing Edible Unsulfonated Water-Soluble Ester of Aliphatic Alcohol—*H. J. Kothe, Bronx, N. Y. to Standard Brands Inc., New York. No. 2,637,654. May 5, 1953.*

Fat Containing Dairy Product Capable of Imparting High Milk Flavor to Foods Made by Hydrolyzing Free Fatty Acids and Removing Portions of Volatile Water-Soluble and Water-Insoluble Free Fatty Acids—*C. A. Kempf and A. P. Stewart, Jr., Berkeley, J. S. Nedlinger, San Francisco, and P. F. Sharp, Oakland, Calif. to Golden State Co., Ltd., San Francisco. No. 2,638,418. May 12, 1953.*

Manufactured Butter Product Incorporating Dialkydithiocarbamic Acid and Salt Substance to Inhibit Rancidity and Deterioration—*F. D. Tollenaar, Utrecht, Netherlands, to de Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoekten bchoeve van de Voeding, The Hague, Netherlands. No. 2,638,420. May 12, 1953.*

Coffee Substitute From Freshly Cut Alfalfa by Pulping, Coagulating Pressed and Drained Juices by Heat, Filtering Proteins From Carbohydrates, Evaporating Foltrate, Dehydrating, Comminuting, Screening—*J. H. Zachary, Arlington, Calif. No. 2,639,236. May 19, 1953.*

Dry Comminuted Casein-Lactic-Acid Composition Which Forms Smooth Curd When Dispersed in Milk—*J. G. Kennedy, Mason, and F. W. Bernhart, Holt, Mich. to American Home Products Corp., No. 2,639,235. May 19, 1953.*

Effervescent Drink Concentrate Made by Heating Mixture of Normally Crystalline Monosaccharide and Inorganic Carbonate—*J. G. Alther, Evanston, and P. M. Van Arsdale, Chicago. No. 2,639,238. May 19, 1953.*

Enriched Sugar Made by Adding Vitamin Complex Solution Bacterially Synthesized in a Sugar Substrate to Syrup, Crystallizing and Separating—*W. L. Owen, Baton Rouge, La. No. 2,640,778. June 2, 1953.*

Turkey Product Composed of Bone and Tendon Free Meat in Layers and Containing Proportioned and Positioned Edible Flavor—*F. George, Berkeley, Calif. ½ to Norbest Turkey Growers Assn., Salt Lake City, Utah. No. 2,640,779. June 2, 1953.*

PROCESSES

Preserving Mushrooms By Exposing to Ozone and Quick Freezing—*J. A. Giacinto, Toughkenamon, Pa., and L. J. Amabili, Hockessin, Del. No. 2,635,051. April 14, 1953.*

Stuffing Pitted Olives With Plug Employing Advancing Sheets of Pimento Folded Into U-Shape—*G. W. Aslock, Jr., Oakland, Calif. No. 2,637,653. May 5, 1953.*

Isolating Essential Coloring Compounds From Caramelized Syrups by Mixing With Alcohol of Special Composition, Separating Solid Material—*J. E. Cleland and J. B. Longenecker, Granite City, Ill. to Union Starch Refining Co., Columbus, Ind. No. 2,637,655. May 5, 1953.*

Treating Continuously Flowing Stream of Lacteal Fluid to Adjust pH by Adding Reagent Under Vacuum—*R. Robichaux, Brodhead, Wis. No. 2,638,419. May 12, 1953.*

Extracting Tea By Filling Evacuated Extractor With Carbon Dioxide, Then Passing Water Through Unit—*W. R. Johnston, Bronxville, I. M. Reich, New York and G. E. Miller, Bronx, to Standard Brands Inc., New York. No. 2,639,237. May 19, 1953.*

Determining Insect Parts in Flour by Separating Starch and Protein, Treating Residue With Solution of Crystal Violet for Differential Color Detection—*R. A. Larkin, Peoria, Ill. to USA. No. 2,639,617. May 26, 1953.*

Potato Chip Bleaching System Employing Rinse Tank, Continuous Heated Bleach Tank, and Integrated Conveyor System—*H. D. Furniss to Gordon Foods, Inc., Atlanta, Ga. No. 2,639,656. May 26, 1953.*

EQUIPMENT

Device for Forming Sealing Caps on End of Packages Employing Thermoplastic End-Coating Application and Subsequent Molding—*S. Bergstein, Cincinnati, Ohio. No. 2,632,918. Mar. 31, 1953.*

System for Wrapping Bread Which Divides Output From Slicing Machine Into Two Stacks That Feed Two Wrapping Machines—*F. R. Schmitt, Queens*

GET FASTER KETTLE HEATING WITH

ARMSTRONG STEAM TRAPS

Summary of tests on 100 gallon aluminum kettle

	KETTLE DRAINED BY		
	No. 213 Armstrong Trap	Restricted Blow Thru ⅜" Orifice	Unrestricted Blow Thru ¾" Pipe
Minutes required to Heat 417 lbs. Water from 43 F. to 212 F.	6.9	7.7	8.6
Pounds of Steam required to Heat 417 lbs. Water from 43 F. to 212 F.	85	90	105
Pounds of Steam Used per lb. of Water Evaporated	1.24	1.33	1.64
Pounds of Water Evaporated per Minute	8.4	7.6	6.4

THE table summarizes results of heating tests on a 100 gal. kettle. It shows that over-all kettle performance is better with an Armstrong trap than with a steam-wasting cracked valve or blow-through arrangement!

Hundreds of food plant installations have proven that Armstrong Traps are thoroughly reliable. They give quick, uniform heating and freedom from steam waste. They seldom require attention. Mechanism is identical in design, material and workmanship to that used in traps for 900 F., 950 lbs. pressure.

POPULAR STYLES

Side inlet-side outlet

Bottom inlet-top outlet

Side inlet-side outlet built-in strainer

Complete data in Free 4-page bulletin, *Are Steam Traps Good For Jacketed Kettles?* Gives proof that properly selected traps are necessary for maximum performance. Discusses trap selection for slow and medium cooking, recommends trap sizes for fast cooking. Send for your copy today.

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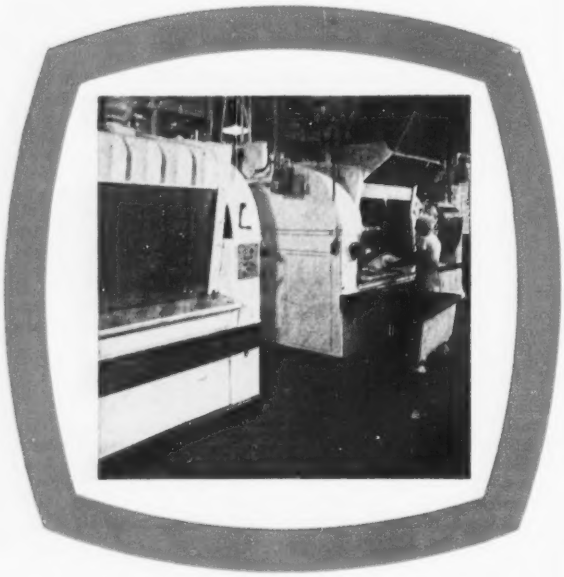
At Its Best!



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ROCKFORD, ILLINOIS

A DOLE "Ice-Cel" Unit is employed here with an ammonia compressor hook-up to supply chilled water for the cooling heads on the dough mixers. In conjunction with a water cooling coil this unit keeps an even temperature in the fermentation room . . . *No water loss, all water being re-circulated.*

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44 Elgin Street. Brantford, Ontario

Maximum Refrigeration Efficiency

DOLE

"ICE-CEL" UNITS

Village, N. Y. *To American Machine & Foundry Co., No. 2,632,985. Mar. 31, 1953.*

Apparatus for Feeding and Orienting Pears—*B. C. Coons to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,632,552. Mar. 24, 1953.*

Food Conveyor Belting Composed of Plurality of Vulcanized Rubber Fabric Plies With Oil Resistant Synthetic Resin Surface—*T. M. Knowland, Belmont, Mass. to Boston Woven Hose & Rubber Co., Cambridge, Mass. No. 2,633,976. April 7, 1953.*

Egg Washing Machine Employing Over-Conveyor Frictional Contact Scrubber—*G. W. Johnson, Raytown, Mo. to Gordon Johnson Co., Kansas City, Mo. No. 2,634,442. April 14, 1953.*

Machine for Splitting Hogs and Beef Comprising Carcass Support, Vertically Moving Cutter and Spreader Mechanism on Slidably Mounted Carriage—*G. F. Mover and W. H. Mitchell, Marshalltown, Iowa. No. 2,634,457. April 14, 1953.*

Hamburg Patty Forming Machine Employing Grinder, Extruder, Periodically Operated Cut-Off Means—*F. S. Elsaesser, Cincinnati, Ohio. No. 2,634,458. April 14, 1953.*

Rice Drier Comprising Housing With Spaced Horizontal Trays, Sloping Perforated Panels, Upward Air Circulation—*W. H. Underwood and E. Toepfer, Crowley, La. No. 2,634,511. April 14, 1953.*

Bakers Swing Tray Conveyor Oven With Controlled Rear Wall Opening to Permit Suction Removal of Steam From Lower Baking Compartment—*J. E. Pointon, to Baker Perkins, Ltd., Peterborough, England. No. 2,634,693, April 14, 1953.*

Machine for Cleaning Eggs Employing Longitudinal Roller, Converging Brush Unit—*H. A. Hutchinson, to H. & P. Egg Cleaner Co., Sebastopol, Calif. No. 2,635,266. April 21, 1953.*

Egg Cleaning Machine With Rotating Cleaning Brush and Rotating Egg Member Forming a Cradle—*D. M. Smith, Morton, Minn. No. 2,635,267. April 21, 1953.*

Poultry Defeathering Machine Employing Direct Impingement by Resilient Pellets in Housing—*C. F. Hunt, Akron, Ohio. No. 2,635,284. April 21, 1953.*

Fruit and Vegetable Washer Comprising Conveyor-Fed Submerging Tank Equipped With Water Jet at Submerged End of Conveyor—*P. T. Ford, Dillon, S. C. to Stansbury Inc., Baltimore, Md. No. 2,635,614. April 21, 1953.*

Meat Mold Stuffing Device Employing Elongated Tubular Mold and Horn With Telescoping Feeding Tube—*F. H. Hoy, Milwaukee, Wis. No. 2,635,799. April 21, 1953.*

Apparatus for Removing Casings From Weiners Precuts Casing at Four Points, Utilizes Four Vacuum-Supplied Radial Gripping Wheels for Stripping—*J. J. Fedevich, Canton, Ohio. No. 2,636,213. April 28, 1953.*

Apparatus for Instant Heat Sterilizing Fruit Juices Employing Direct Pressure Steam Injection and Vacuum Flash Cooling—*A. H. Brown, El Cerrito, P. W. Kilpatrick, Albany, and M. E. Lazar, Oakland, Calif. to USA No. 2,636,430. April 28, 1953.*

Sanitary Pump with Infinitely Variable Output by Pressure Adjusting Screw—*G. R. Funk, to Waukesha Foundry Corp., Waukesha, Wis. No. 2,636,440. April 28, 1953.*

Adjustable Mounting for Pressure Board of Dough Molding Machine—*E. Martin, Wesleyville, Pa. to Read Standard Corp., of Del. No. 2,636,455. April 28, 1953.*

Device for Applying Oil to Surfaces of Dough Pieces on Conveyor Employing Oil-Dipped Flexible Chain Roller System—*H. C. Rhodes, Portland, Ore. to Read Standard Corp., of Del. No. 2,636,470. April 28, 1953.*

Device for Separating Eggs From Flat and Filler Assembly—*E. W. Fahey, to Shellmar Products Corp., Chicago, No. 2,636,624. April 28, 1953.*

Electronic Egg Tester and Grader Utilizing RF Oscillator and Receiver Interposed Around Egg at Adjustable Distance—*T. Gascoigne, Cloverdale, British Columbia, Canada. No. 2,636,925. April 28, 1953.*

Shrimp Peeling and Veining Machine Employing Orienting Platform and Rotating Piercing Wheel—*N. Miller, Manteo, N. C. No. 2,637,046. May 5, 1953.*

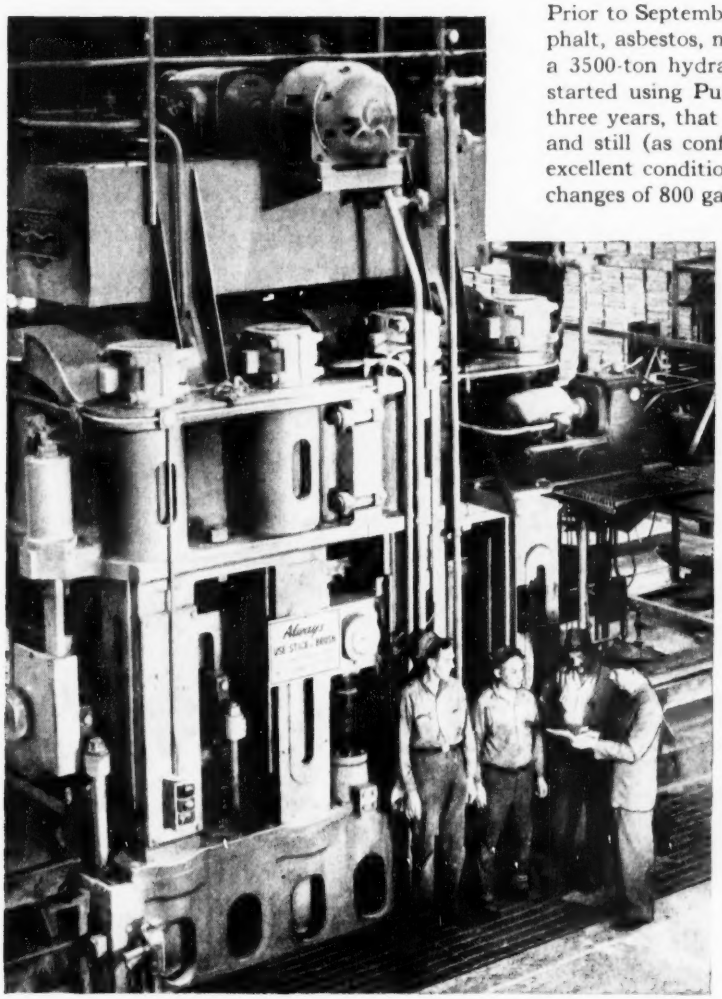
Shrimp Cleaner and Peeler Utilizing Series of Spaced Rollers that Pinch Meat From Trash—*F. S. Lapeyre, New Orleans, and E. M. Lapeyre, Houma, to The Peelers Co., Houma, La. No. 2,637,065. May 5, 1953.*

Poultry Chilling Apparatus Employing Retractable Looped Belt to Retain Poultry Inside Flaked Ice Bearing Tank—*G. W. Johnson, Raytown, Mo. to Gordon Johnson Co., Kansas City, Missouri. No. 2,637,066. May 5, 1953.*

Poultry Plucking Machine Employing Plurality of Longitudinally Spaced Disks With Rods Bearing Flexible Resilient Fingers—*G. W. Johnson, Raytown, Mo. to Gordon Johnson Co., Kansas City, Mo. No. 2,637,067. May 5, 1953.*

For more information, use coupon on page 157.

How Carey saved 4800 gallons of hydraulic oil in 3 years!



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Sausage Making Machine Utilizing Reciprocal Pump to Push Meat Through Rotatable Hollow Shaft Into Casing—*W. Koffer, New York.* No. 2,637,068. *May 5, 1953.*

Candy Preforming Machine Employing Rotating Frame and Complemental Die Members With Compressing Means—*L. and E. Latini, Chicago to L. Latini.* No. 2,637,281. *May 5, 1953.*

Unit Prefabricated Heating System for Baking Ovens—*C. Klein, Warrenville, R. C. Skarkin, Western Springs, and W. G. Tinker, Itaska, Ill. To Peterson Oven Co., Frankling Park, Ill.* No. 2,637,253. *May 5, 1953.*

Egg Conveyor System Employing Three Horizontal Endless Belts—*E. W. Fahey, to Shellmar Products Corp., Chicago.* No. 2,637,345. *May 5, 1953.*

Carcass Splitter Employing Elliptical Housing With Motor-Driven Arcuate Saw Arm and Guided Saw Blade—*H. L. Davis, Payette, Idaho.* No. 2,637,354. *May 5, 1953.*

Egg Handling Apparatus Adapted to Transport Egg-Containing Fillers Comprising Series of Parallel, Flexible, Laterally-Spaced, Endless Conveyor Members—*E. W. Fahey, to Shellmar Products Corp., Chicago.* No. 2,637,458. *May 5, 1953.*

Device to Separate Insects From Grain Comprising Gyrating Container, Separating Screen and Moving Ball Weights to Crush Separated Insects—*H. R. Klink, Roanoke, Va.* No. 2,637,624. *May 5, 1953.*

Extraction Tower for Comminuted Materials of Vegetable or Plant Origin, Particularly Sugar Beets, Employing Elevating Spiral in Vertical Tower—*E. Langen, Elsdorf, Germany.* No. 2,637,666. *May 5, 1953.*

Apparatus for Releasing Frozen Confections From Sections of Mold Employing Hot Fluid Dunking Bath With Telescoping Support in Tank Receptacle—*K. Efthios, New Orleans, La.* No. 2,637,688. *May 5, 1953.*

PACKAGING

Method of Evacuating and Heat Sealing Packages Employing 2-ply Package to Secure Channel for Drawing Internal Vacuum—*W. G. Mueller, F. H. Cherepow and A. Bartes, Jr., Neenah, and K. Klause, Appleton, Wis. to Marathon Corp., Rothschild, Wisconsin.* No. 2,634,562. *April 14, 1953.*

Machine for Sealing Ends of Tubular Wrappers Employing Nozzle Injecting Sealing Substance and Fold-Pressure Closing—*S. Bergstein, Cincinnati, Ohio.* No. 2,634,564. *April 14, 1953.*

Package Sealing Machine Applies Tape to Boxes—*J. R. Flanagan, Westville Grove, N. J. to Stephen F. & Whitman & Son, Inc., Philadelphia, Pa.* No. 2,634,876. *April 14, 1953.*

Apparatus for Packing Elongated Food Articles in Cans Employing Rotating Wheel With Food-Bearing Pockets for Progressive Filling of Shaking Containers Below—*R. Polk Sr., and R. Polk, Jr., to The Polk Development Co., Tampa, Fla.* No. 2,634,893. *April 14, 1953.*

Natural Cheese Package Comprising Oil-Proof Wrapper With Free Flowing Oil on Inner Face—*E. E. Eldredge, Plymouth, Wis. to The Borden Co., New York.* No. 2,635,049. *April 14, 1953.*

Can Marking Apparatus With Overhead Marker and Starwheel Actuation—*J. K. Bruce, South Pasadena, and W. E. Long, Bellflower, Calif. to Bruce Engineering Corp., Pasadena.* No. 2,635,531. *April 21, 1953.*

Machine for Imprinting Indicia at Predetermined Location on Cylindrical Containers — *James Stewart, Homewood, Ill.* No. 2,635,532 and No. 2,635,533. *April 21, 1953.*

Method of Packaging Food Products in Slab Form With Divider Between Slices—*B. T. Hengsen and J. C. Vanden Bosch, to Swift & Co., Chicago.* No. 2,635,965. *April 21, 1953.*

Frozen Food Carton Comprising Open Top Paperboard Body With Corner Lap Joint and Plastic Friction Cover—*W. J. Poole, Evanston, Ill. to Container Corp. of America, Chicago.* No. 2,638,261. *May 12, 1953.*

Machine for Dating and Applying Closures to Bottles With Timed Selection and Embossing Mechanism—*W. E. Zimmerman, to Standard Packaging Corp., Chicago.* No. 2,639,550. *May 26, 1953.*

Can Testing Head Adaptable to Various Can Sizes Employing Adjustable Clamping Head and Sealing Pad—*W. W. Maher, San Francisco, Calif. to American Can Co., New York.* No. 2,641,126. *June 9, 1953.*

Cork Bottle Closure With Metal Top Employing Annular Ring Slightly Below Cork Top to Permit Expansion in This Region—*J. N. Stewart, Stirling, Scotland to Kork-N-Seal Ltd., London, England.* No. 2,641,375. *June 9, 1953.*

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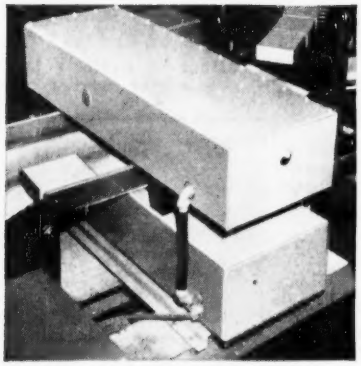

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RCA Metal Detector finds stray metal in raw or packaged product

NOW YOU CAN SAFEGUARD product quality completely . . . *automatically* . . . *electronically* . . . *economically*—with an RCA Metal Detector. It will provide 100% inspection—will thoroughly search every ounce of your product during processing or packaging operations. Tramp metal as tiny as a .039" diameter steel sphere will be located by the RCA Metal Detector . . . at conveyor speeds up to 1,000 feet per minute.

Use it to shut down your line, sound an alarm, or divert contaminated items from your line.

This dependable unit probes all the way through bulk materials and package goods—finds metal no matter how deeply imbedded.

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Men & Companies

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IFT ELECTS: New president of Institute of Food Technologists, which recently met in Boston, is Philip K. Bates, general manager of research, Carnation Co., Santa Monica, Calif. He succeeds Berton S. Clark, scientific director of American Can Co., Maywood, Ill. Named treasurer was Aksel G. Olsen, technical director of applied research at General Foods Corp.'s central laboratories, Hoboken, N. J.

Industry

A. E. Staley Mfg. Co., corn and soybean processor, is erecting new 440 ft. warehouse at Decatur, Ill., plant site.

American-Israel Cattle Corp. has been established to pack meat products in Tel Aviv.

Armour and Company has purchased **Karas Sausage Co., Inc.**, of Buffalo.

Bateman Canning Co., Macon, Ga., is scheduled to begin construction of large canning plant with capacity of 5,000 cases per day.

Cott Beverage Corp. has opened bottling plant in New York, company's eleventh plant in expansion movement.

Forest City Sausage Co. has begun construction of a $75,000 plant near Forest City, N. C.

Hawaiian Pineapple Co., Ltd., has installed $400,000 improvements at its Honolulu cannery.

Kraft Foods Co. of Wisconsin will build a food processing plant at New Ulm, Minn.

Henry S. Levy & Son, Inc., New York bakery, will franchise hearth baked white bread nationally.

Minute Maid Corp. has acquired a one third interest in **Golden Citrus Juices, Inc.**, Fullerton, Calif.

Morton Packing Co., has acquired manufacturing and cold storage plant of **Crozet Cold Storage Co.**, Crozet, Va.

National Biscuit Co. is building $1 million addition to its Denver bakery to be completed in December.

S. & W. Fine Foods has appointed Thomas G. McGuire and Arthur Franken as directors.

Spreckels-Russell Dairy Co. has opened its newest San Francisco plant.

Wine & Schultz, Louisville, has leased former **Martin Pie Co.** plant to process line of salads under Judy Ann trade name.

Personnel

Thomas A. Guneo, president of Ronco Foods, Memphis, is re-elected president of National Macaroni Manufacturer's Assn.

S. Arthur C. Dahlberg has been appointed advisor to

Joseph M. Friedlander, financial vice-president of Jewel Tea Co., Inc., has been elected to board of American Management Assn. for the 1953 1956 term.

BACK IN THE 1880's

WHEN THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS WAS FOUNDED

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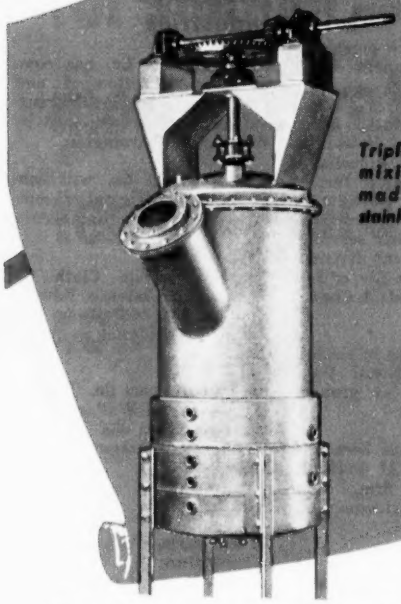
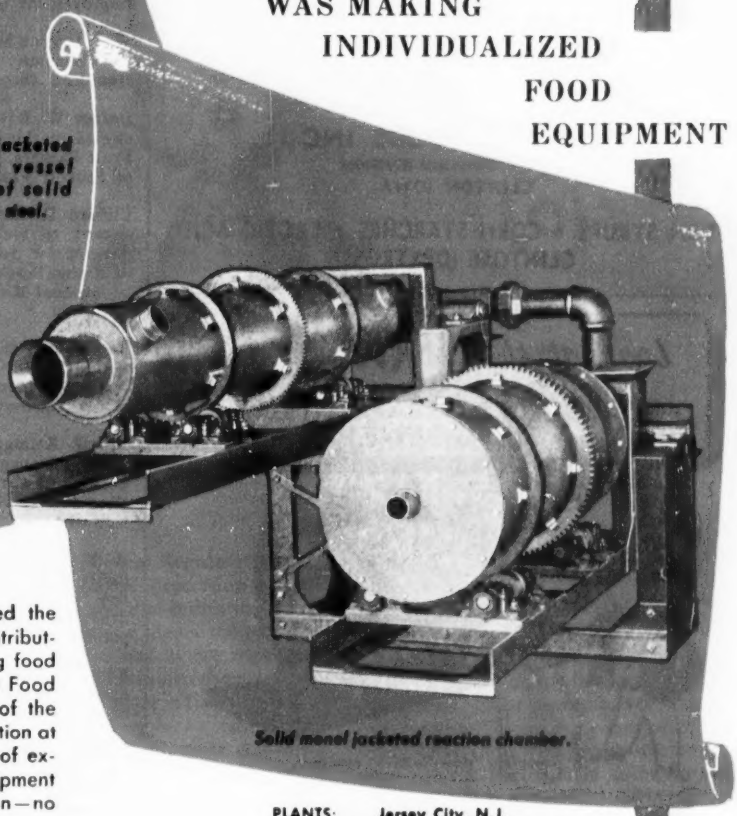


Triple jacketed mixing vessel made of solid stainless steel.



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Complete modern facilities including X-ray inspection and stress relieving which insures quality control. KOVEN equipment in all commercial metals and alloys incude: pressure vessels, extractors, mixers, stills, condensers, kettles, tanks, chutes, containers, stacks, coils. Fabrication to A.S.M.E. Code Par. U-68 and U-69 a specialty.

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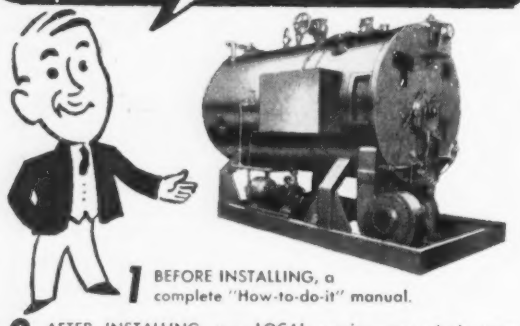

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BOX C-83, OSWEGO, N.Y.

Henry Markus, executive vice-president of Mogen David Wine Corp. since 1933, has succeeded **Max Cohen** as president. Mr. Cohen has been appointed chairman of the board.

Robert S. Wright has assumed duties as New England manager for all Durkee Famous Foods products. He is former administrative assistant of Elmhurst, N. Y. operations.

board of Dairy Products Improvement Institute.

W. I. Drynan is new president of Canadian Canners Ltd., Hamilton, Ont.

Dorsey W. Edwards has been elected president of Hawaiian Fruit Packers, Ltd, subsidiary of Stokely-Van Camp, Inc.

Clifford F. Evers is new assistant to technical services director for Accident division of Amino Products Div. of International Minerals & Chemical Corp.

Phillip P. Gott was re-elected president of National Confectioner's Assn. at group's annual convention.

Ray J. Kellogg has been appointed manager of Swift & Co.'s associate firm, Van Wagenen & Schickhaus Co., Newark.

A. F. Leathers, manager of Swift & Co.'s Spokane plant, has been named manager of firm's South San Francisco plant.

Edward A. McLaughlin has assumed duties as president of Ward Baking Co.

Dr. Roy E. Morse is new director of research for William J. Stange Co., manufacturers of seasonings, food colors and anti-oxidants.

W. J. R. Paton is newly appointed production manager for Robin Hood Flour Mills, Ltd., Port Colborne, Ontario.

Donald Rudolph is new resident manager of National Sugar Refining Co.'s Cleveland plant.

Dr. Harold W. Schultz of Swift & Co. has been named head of Oregon State College's food technology department.

Associated Industries

American Can Co. has completed construction of new Plymouth, Fla., manufacturing plant, to be managed by William J. Fairnington.

Brunner Mfg. Co. will construct a refrigeration-compressor plant at Gainesville, Ga.

Cambridge Wire Cloth Co. has named Clarence Edward Pink as board chairman and Edward N. Evans as president.

Specialty Papers Co., Dayton, O., has named Wallace Whittaker as board chairman and William P. Patterson as president.

Visking Corp. will form a joint company with **Novacel S. A.,** Paris, France, for the manufacture of cellulose sausage casings in France.

Deaths

Milford W. Hahn, 64, San Francisco meat firm president. —May 24.

Stanley J. Klein, 50, president of Empire Box Corp.—June 14.

Jack P. Ricci, 48, Southern California fruit and juice processor.—May 22.

Donald E. Wilcox, 47, president and general manager of Wilcox Frozen Food Co.—May 30.

Frank A. Werner, 76, vice-president and treasurer of Cracker Jack Co.—July 6.

Dr. Frank L. Seymour-Jones, 57, director of new products research laboratory of Borden Co.—July 2.

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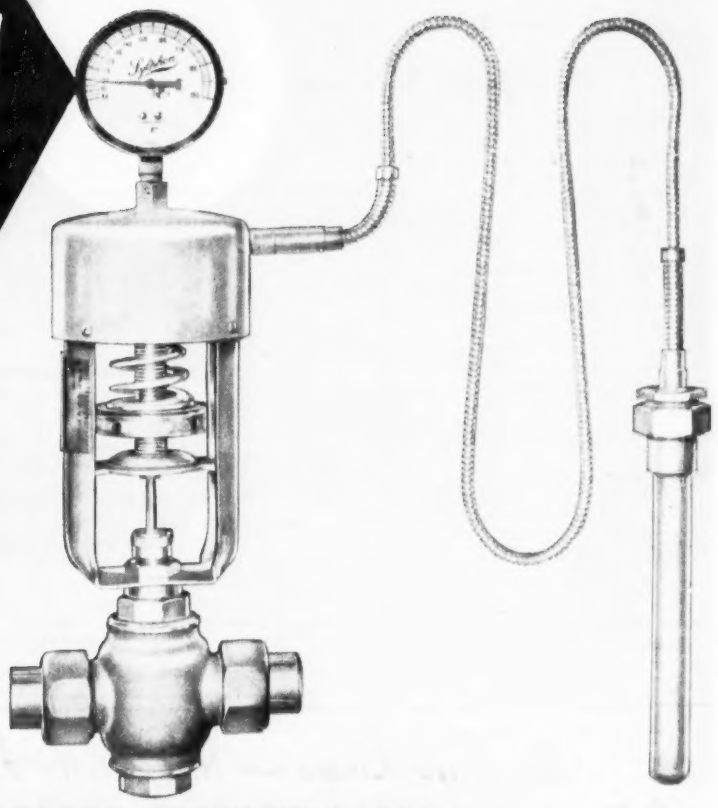

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New Catalogs and Bulletins
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Food Plant Equipment

Cooling Towers

Catalog L-19,092B covers line of specialized equipment including cooling towers, and heat exchanger equipment. 8 pages.—*J. F. Pritchard & Co., 908 Grand Ave., Kansas City 6, Mo.*

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Carton-Stapling Machines

Bulletin C-201 covers complete line of corrugated and fiber carton-stapling machines. 12 pages.—*International Staple & Machine Co., 809 E. Herrin St., Herrin, Ill.*

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Sealing Iron

Three styles of sealing iron are described in leaflet.—*Great Lakes Stamp & Mfg. Co., Inc., 2500 Irving Park Road, Chicago 18.*

Circle 200C on Reader Service Card

Steam Jacketed Kettles

Stainless steel steam-jacketed kettles are presented in leaflet through photos and specifications. —*Groen Mfg. Co., 4539 W. Armitage Ave., Chicago 39.*

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Automatic Boilers

Self-contained, fully automatic, assembled boilers are dealt with in Bulletin A-104.10. — *Eclipse Fuel Engineering Co. Rockford, Ill.*

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Vacuum Pumps

Catalog 750 presents line of high vacuum and vacuum pumps through photos, diagrams, and text. 34 pages.—*F. J. Stokes Machine Co., Philadelphia 20.*

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Continuous Feeders

Constant weight continuous feeder is described in illustrated Bulletin 5202.—*Richardson Scale Co., Clifton, N. J.*

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Screw Pumps

Bulletin WQ-S205 treats with line of screw pumps through photos, diagrams, and dimensions. 12 pages.—*Warren Steam Pump Co., Inc., Warren, Mass.*

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Sprocket Chains

Bulletin 53-110 features line of sprocket chains and power transmission equipment. 58 pages.—*Chain Belt Co. of Milwaukee, Milwaukee 1.*

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V-Belts

Industrial V-belt catalog includes charts, tables and horsepower ratings. 60 pages.—*Durkee-Atwood Co., Minneapolis 13.*

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Heat Exchangers

Catalog 5 lists types of heat exchangers and hot water storage heaters. 16 pages.—*Patterson-Kelley Co., Inc., 373 Warren St., East Stroudsberg, Pa.*

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Controlled Volume Pumps

Bulletin 553 fully describes line of motor driven controlled volume pumps. 40 pages.—*Milton Roy Co., 1300 E. Mermaid Lane, Chestnut Hill, Philadelphia 18.*

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Magnetic Trap

Non-electric magnetic separator for removal of tramp iron from liquids and slurries is featured in Bulletin 103. 8 pages.—*Columbia Engineering Service Co., Santa Rosa, Calif.*

Circle 200M on Reader Service Card

Packaging Machines

Colorful leaflet illustrates packaging machine models. 6 pages.—*Clybourn Machine Corp., 6469 N. Avondale Ave., Chicago 31.*

Circle 200N on Reader Service Card

Industrial Motors

Detailed information on performance, dimensions, construction data and installation photos of line of industrial motors and generators is contained in catalog. 12 pages. —*Electro Dynamic, Bayonne, N. J.*

Circle 200O on Reader Service Card

Industrial Dampers

Bulletin 8502 describes line of dampers engineered to suit all industrial needs. — *Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

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Valve Data

Complete and comprehensive valve catalog features valve selector guide, reference data, and code requirements. 506 pages.—*Lunken-*

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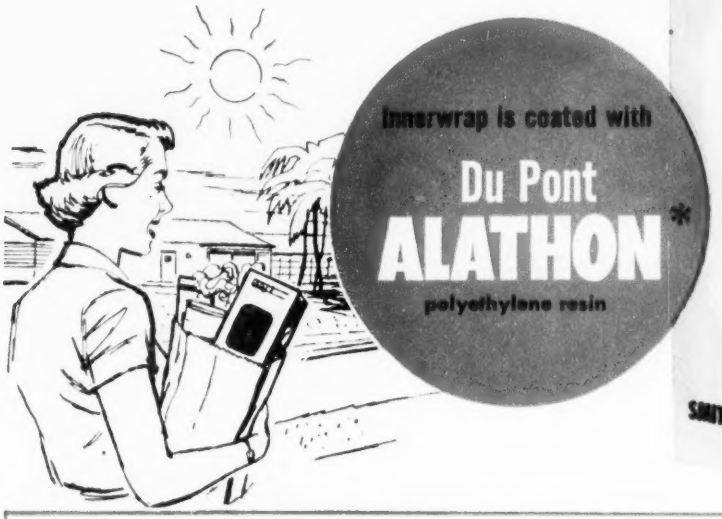

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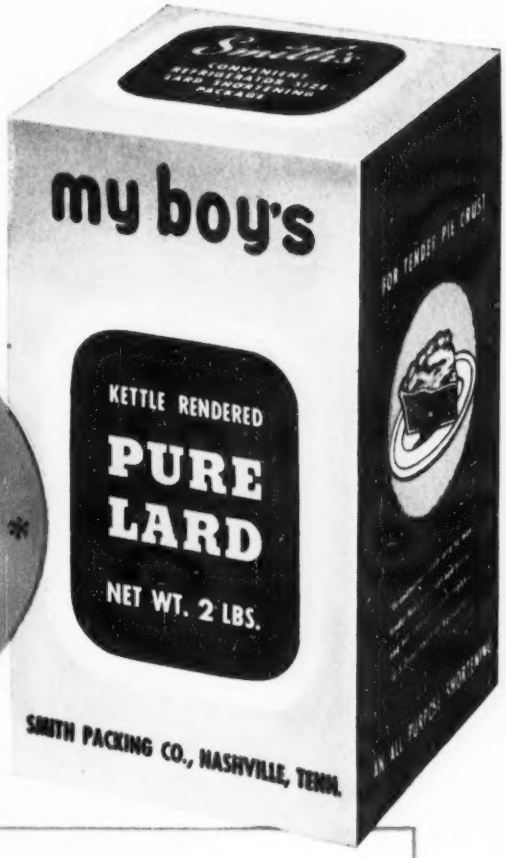

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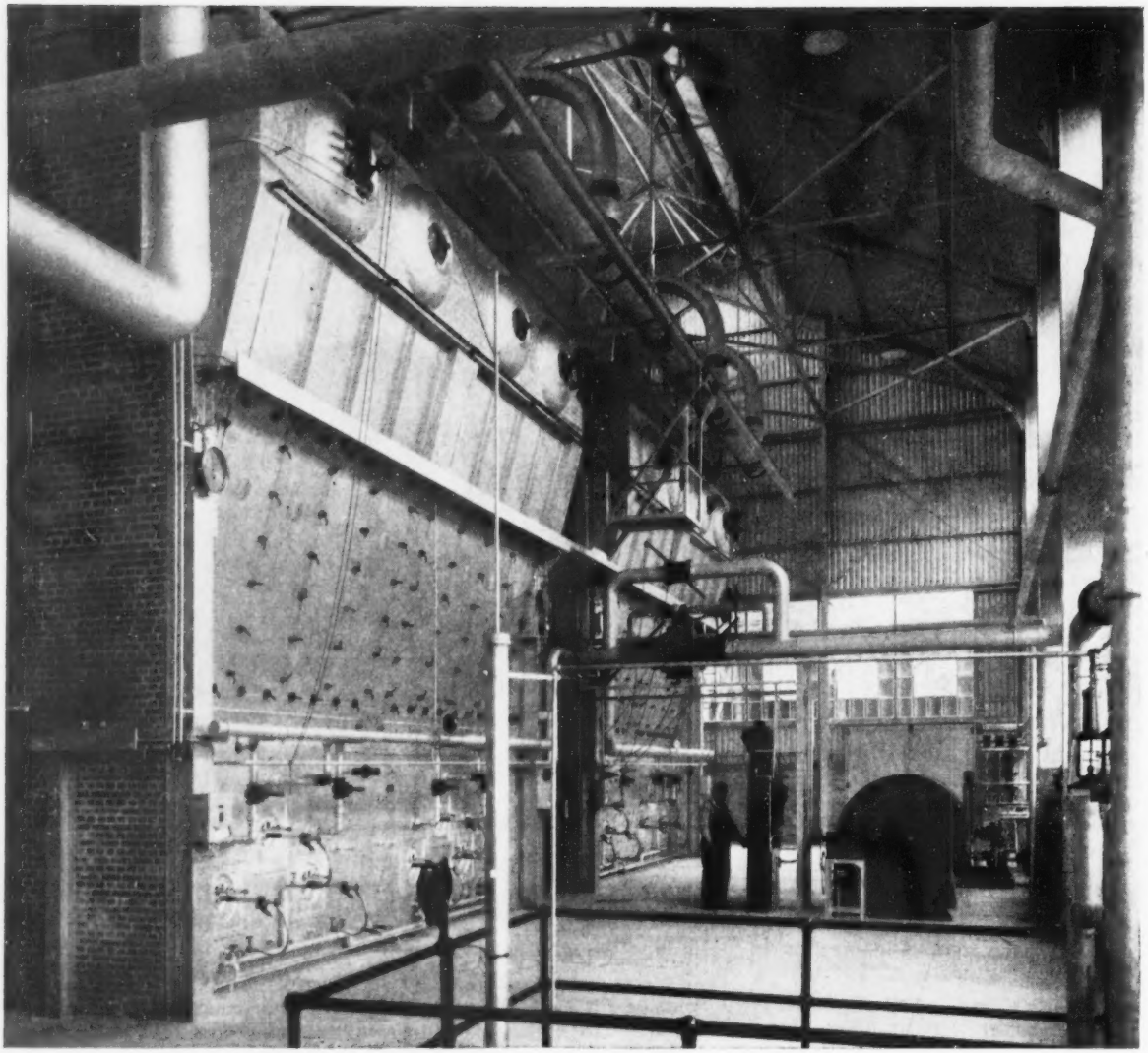

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Package Tying Machines

Brochure covers variety of uses and advantages of package-tying machines. 4 pages.—*B. H. Bunn Co., 7605 Vincennes Ave., Chicago, 20.*

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Confectionery Equipment

Production of candy with use of line of confectionery processing equipment is subject of booklet. 6 pages. — *National Equipment Corp., 153-157 Crosby St., New York 12.*

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Filling Machines

Bulletin 4962 illustrates and describes line of filling machines. 4 pages.—*Stokes & Smith Co., 4962 Summerdale Ave., Philadelphia 24.*

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Steam Tube Dryer

Low temperature, but high evaporative capacity type dryers are dealt with in Bulletin 53. 18 pages.—*General American Transportation Corp., 139 S. Fourth St., Louisville 2.*

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Spray Dryers

Advantage of centrifugal wheel and nozzle atomization in spray drying equipment is explained in booklet. — *Bowen Engineering, Inc., North Branch, N. J.*

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Vacuum Filler

Semi-automatic vacuum filler is illustrated in leaflet.—*U. S. Bottlers Machinery Co., 4015 N. Rockwell St., Chicago 18.*

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Freon Condenser

Leaflet describes standardized freon condenser. 4 pages.—*Doyle & Roth Mfg. Co., Inc., 136-50 24th St., Brooklyn 32.*

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Fuel-Burning Systems

Booklet covers advantages of complete factory coordinated industrial fuel-burning systems. 16 pages.—*York-Shipley, Inc., York, Pa.*

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Meat Permeators

Bacon curing in 24 hours with meat permeator is discussed in booklet. 4 pages. — *Cincinnati Butchers Supply Co., Cincinnati 16.*

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Twist Wrapper

Four major advantages of hopper fed twist candy wrapper are listed in leaflet.—*Package Machinery Co., Springfield, Mass.*

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Strapping Machines

Electrically powered and controlled strapping machine is subject of brochure.—*Acme Steel Co., 2840 Archer Ave., Chicago 8.*

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Vertical Turbine Pumps

Bulletin 8502 describes line of vertical turbine pumps as a solution to pumping problems.—*Worthington Corp., Harrison, N. J.*

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Variable Speed Motors

Bulletin 1797 outlines use of variable speed motors to improve production.—*U. S. Electrical Motors Inc., Box 2058, Los Angeles 54.*

Circle 203N on Reader Sevice Card

Control Equipment

Laboratory Filter

Stainless steel laboratory featuring stainless steel filter element is presented in brochure. — *Micro Metallic Corp., Glen Cove, N. Y.*

Circle 203O on Reader Service Card

Temperature Controller

Direct reading temperature controller working on electron control principle is dealth with in Bulletin F-5783. 4 pages.—*Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.*

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Precision Scales

Illustrated folder presents precision scales featuring frictionless indication. 4 pages. — *Exact Weight Scale Co., Columbus 8, O.*

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Telemetering

Booklet contains information on use of telemeter for measurement and control of variables.—*Bristol Co., Waterbury 20, Conn.*

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Pyrometer Controller

Potentiometer signaling type pyrometer controller is subject to leaflet. — *Thermo Electric Co., Inc., Fair Lawn, N. J.*

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Vaporizing Controls

Condensed catalog discusses line of controls for vaporizing in oil burning appliances.—*A-P Controls Corp., Milwaukee 45.*

Circle 203T on Reader Service Card

Flow Control

Two-port multi-range flow control valves are explained through diagrams and dimensions in Bulletin VFC-1.—*Denison Engineering Co., Columbus 16, O.*

Circle 203U on Reader Service Card

CAR PULLERS . . .

Bulletin No. 842 describes and pictures Jeffrey Car Spotters. Two types for handling one to six cars. Also used for docking barges, handling moving operations in lumber yards, foundries, steel mills, brick plants, and other industries. Specifications upon request.

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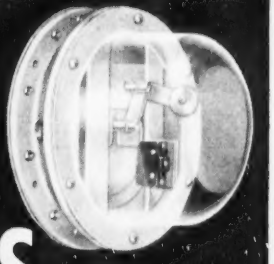

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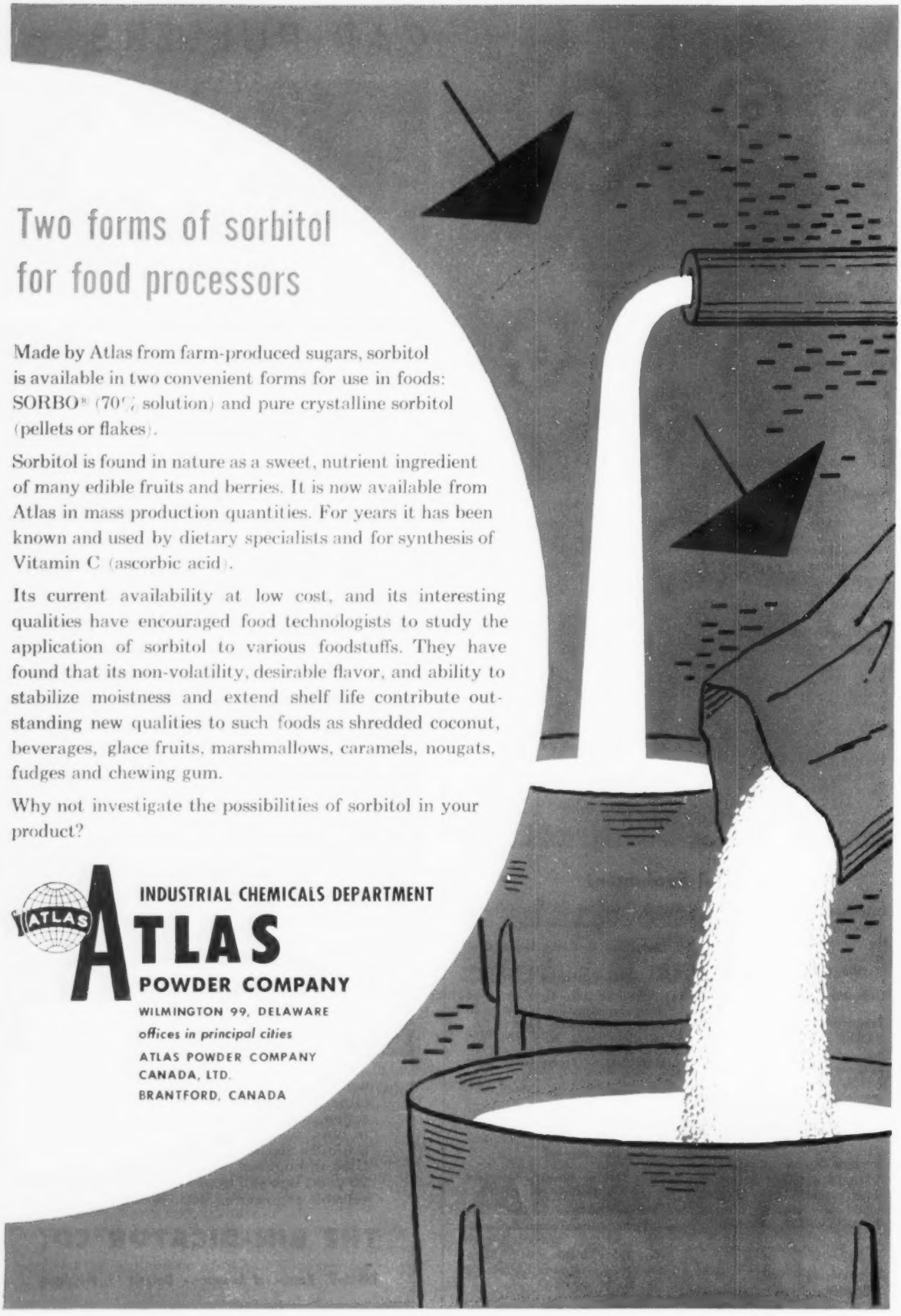

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Drainage Control

Catalog 500 deals with condensate drainage control combining seven devices. 16 pages.—Velan Engineering Co., 1 Exchange Pl., Jersey City.

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Laboratory Equipment

Catalog contains photos and specifications of line of laboratory equipment. 16 pages.—Scientific Glass Apparatus Co., Inc., Bloomfield, N. J.

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Control Maintenance

Proper Maintenance of Control tells what to look for in maintaining equipment properly. 8 pages.—Allis-Chalmers Mfg. Co., Milwaukee 1.

Circle 205C on Reader Service Card

Humidity Control

Direct recording and control of humidities is explained in leaflet.—Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne & Windrim Aves., Philadelphia 44.

Circle 205D on Reader Service Card

Float Controls

Catalog 46 covers application and selection of float controls. 4 pages.—H. A. Phillips & Co., Chicago 24.

Circle 205E on Reader Service Card

Filter Sheets

Brochure features asbestos filter sheets with applications and advantages. 4 pages.—Ertel Engineering Corp., Kingston, N. Y.

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Materials Handling

Portable Conveyor

Conveyor designed primarily for weights up to approximately 500 lb. is subject of Catalog 252. 4 pages.—Towbridge Conveyor Co., 851 Van Houten Ave., Clifton, N. J.

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Tubular Conveyors

Catalog covers complete line of tubular conveyors featuring photos, diagrams, and data on applications and trials. 39 pages.—Hapman Conveyors, Inc., Kalamazoo, Mich.

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Pneumatic Handling

Bulletin 4501 deals with pneumatic method of handling bulk materials. 8 pages.—Yeoman Bros. Co., 1999 N. Ruby St., Melrose Park, Ill.

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Hydraulic Lift Trucks

Specifications and photos of hydraulic lift truck line are contained in brochure. 4 pages.—Big Joe Mfg. Co., 900 W. Jackson Blvd., Chicago 7.

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Boxcar Shipment

Bulletins discuss details and advantages of bulk shipment by new model boxcars.—General American Transportation Corp., 135 S. LaSalle St., Chicago 90.

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Fork Lift Trucks

Booklet offers operating tips on use of fork lift truck models. 12 pages.—Lewis-Shepard, Watertown 72, Mass.

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Gravity Conveyors

Gravity wheel conveyors, gravity wheel conveyors and accessories are subject of catalog.—Speedways Conveyors Inc., 1263 Niagara St., Buffalo 13.

Circle 205M on Reader Service Card

Fork Truck Lubrication

Described and illustrated in Bulletin 34-13 is centralized lubrication system in fork lift trucks. 4 pages.—Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9.

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Aluminum Advantages

Aluminum in Materials Handling covers results of survey on topic. 20 pages.—Aluminum Assn., 420 Lexington Ave., New York 17.

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Wheel Conveyor

Leaflet deal with advantages of steel wheel conveyor.—Rapids-Standard Co., Inc., Rapistan Bldg., Grand Rapids 2.

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Light-Duty Trucks

Catalog covers line of light-duty trucks from panel to pickup models. 24 pages.—International Harvester Co., 180 N. Michigan Ave., Chicago 1.

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Steel Pails

Leaflet features steel shipping pails for food products, as well as other steel containers.—Vulcan Steel Container Co., P. O. Box 367, Bellwood, Ill.

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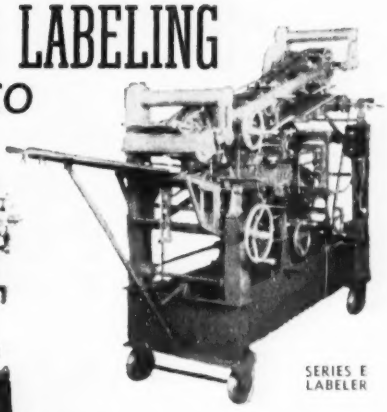

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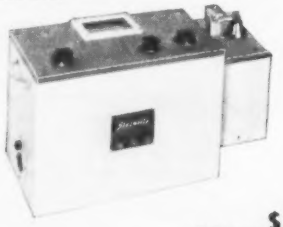

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Steel Fabrication

Brochure explains services and advantages of steel fabricating firm. 8 pages.—*Wm. Bros. Boiler & Mfg. Co., 1057 10th Ave., SE, Minneapolis 14.*

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Rubber Parts

Molded and extruded rubber parts are listed in illustrated catalog.—*Tyer Rubber Co., Industrial Div., Andover, Mass.*

Circle 206B on Reader Service Card

Plastic Resurfacer

Speed and strength are advantages claimed for plastic floor resurfacer in leaflet. 4 pages.—*Montoe Co., Inc., Cleveland 6.*

Circle 206C on Reader Service Card

Glare Eliminators

Leaflet deals with sun glare eliminator applied to plant windows by brush. 4 pages.—*Tropical Paint & Oil Co., Cleveland 2.*

Circle 206D on Reader Service Card

Tin Cans

Leaflet discusses can supply service.—*Vulcan Tin Can Co., PO Box 367-T2, Bellwood, Ill.*

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Stainless Wire

Technical data on application of stainless steel wire is contained in booklet. 18 pages.—*Allegheny Ludlum Steel Corp., Pittsburgh 22.*

Circle 206F on Reader Service Card

Plant Insulation

Insulation of floors, walls, and ceilings with rigid cellular glass is subject of booklet. 24 pages.—*Pittsburgh Corning Corp., 1 Gateway Center, Pittsburgh 22.*

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Germicidal Activator

New disinfecting agents for use in bottling, canning, brewing, and dairy industries is reported in bulletin. 12 pages.—*United States Movidyn Corp., Chicago 10.*

Circle 206H on Reader Service Card

Polyethylene Film

Characteristics and applications of tasteless and odorless film extruded from polyethylene resin are contained in pamphlet. 9 pages.—*Visking Corp., Preston Div., PO Box 1410, Terre Haute, Ind.*

Circle 2061 on Reader Service Card

Concrete Treatment

Hardening, dustproofing and waterproofing concrete with silicate of soda is subject of Bulletin 34-1. 8 pages.—*Philadelphia Quartz Co., Public Ledger Bldg., Philadelphia 6.*

Circle 206J on Reader Service Card

Paint Spraying

Complete line of spray painting equipment, supplemented by infrared drying equipment, air compressors and respirators, is listed in Catalog A-50. 52 pages.—*DeVilbiss Co., Toledo 1.*

Circle 206K on Reader Service Card

Miscellaneous

Safety Posters

Colorful directory to occupational safety posters offers reproductions of posters and sizes. 74 pages.—*National Safety Council, 425 N. Michigan Ave., Chicago.*

Circle 206L on Reader Service Card

Quality Reports

The Quality Report and its Advantages is a concise manual for engineers and others interested in the quality report. 12 pages.—*Hunter Spring Co., Lansdale, Pa.*

Circle 206M on Reader Service Card

Industrial Television

Catalog E.50 contains data on use of television as a means of following industrial processes. 4 pages.—*Radio Corp. of America, Engineering Products Dept., Camden, N. J.*

Circle 206N on Reader Service Card

Intercom Systems

Two-way speaking system featuring approved shielded cable is subject of brochure.—*Magic Voice Mfg. Co., 1336 Fulton St., Bklyn 16.*

Circle 2060 on Reader Service Card

X-Ray Analysis

Booklet offers technical data on X-Ray analysis, explaining specimen preparation, and crystal calibration and selection. 8 pages.—*Research & Control Instruments Div., North American Phillips Co., Inc., 750 S. Fulton St., Mount Vernon, N. Y.*

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Organoleptic Testing

Scientific analysis of flavor and odor by panel method is described in brochure. 8 pages.—*Evans Research & Development Corp., 250 E. 43rd St., New York 17.*

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Acetate Drawings

Printed acetate sheets for use by draftsmen are discussed in brochure. 4 pages.—*Stanpat, Whitestone, N. Y.*

Circle 206R on Reader Service Card

Insecticide Fog

Control of industrial infestation through fogging and spraying equipment is discussed in brochure. 4 pages.—*West Disinfecting Co., 42-16 West St., Long Island City 1, N. Y.*

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Warehousing, Plant Layout, Production Handling

Greenwich, Connecticut, U.S.A.

Your inquiry will have Special Value . . .

If you mention this magazine when writing advertisers. Naturally, the publisher will appreciate it . . . but, more important, it will identify you as one of the men the advertiser wants to reach with this message . . . and help to make possible enlarged future service to you as a reader.

WHEN TIME IS SHORT . . . .

put the solution of your problems up to a specialized Consultant whose professional card appears on this page. His broad experience may save you months of costly experimentation.

FOOD ENGINEERING
330 West 42nd St., New York 36, N. Y.

LEWIN ASSOCIATES

Industrial Consultants

DAVID N. LEWIN, Ph.D. FOOD CONSULTANT
JOSEPH D. LEWIN, CONSULTING ENGINEER
Design — Layouts — Investigations — Consultations — Reports — Market Investigations — Bakeries, Dairy Products —Food Preserving by Heat, Drying, Freezing—Consultation in Managing, Warehousing, Distribution—Formulae, New Products.
8 West 17 St., N. Y. 36, N. Y. JUdson 6-1748

KARL B. NORTON & ASSOCIATES

Successors to
DONALD K. TRESSLER & ASSOC.
Food Technologists and Engineers

Specialists in Food Preparation and Preservation; Equipment Testing and Evaluation; Food Freezing; By-Product Utilization; Manufacture of Pure Fruit Flavors.

North Compo Road, Westport, Conn.

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., Inc.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

If **this or other advertising does not supply the information wanted concerning ingredients for the food processor, please write:**
FOOD ENGINEERING

GUSTAVE T. REICH

Consulting Chemical Engineer

Continuous Processes — Sugar
Complete Plants — Yeast, Molasses
Alcohol - Dry Ice - Waste

1122 Chestnut St., Philadelphia 2, Pa.

SCHWARZ LABORATORIES, Inc.

Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations.
Legal Testimony
Write for bulletin describing facilities and services
230 Washington St., Mount Vernon, N. Y.

FOSTER D. SNELL, INC.

Research Chemists and Engineers

Organoleptic Panel Testing, Formulation and Stability; Protective Packaging.
Inquiries invited on food research problems.
(Official Laboratory Association of Food Distributors, Inc.)
29 West 15th Street, New York 11, N. Y.
WA 4-8800

STRASBURGER & SIEGEL

Chemists - Bacteriologists — Food Technologists
Specialists in Canned and Glass-ed Foods
Laboratory Services

Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods, Food and Drug Labels, Expert Testimony
1403 Eutaw Place, Baltimore 17, Maryland

Ingredients
For the Food Processor

CARROT OIL makes foods golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A. Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET

New 36 page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

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Send NEW ADVERTISEMENTS to New York Office, 330 W. 42nd St., New York 36, N. Y., for the September Issue closing August 26th

CEREAL CHEMIST

Nationally known food processor in New Jersey has permanent opening for experienced Cereal Chemist:

Up to 45 years of age
Ph.D. degree preferred
Training in Organic
or Biochemistry
Starting salary commensurate
with training
and experience

Submit detailed resume of personal history, education and experience to

P-8587
Food Engineering
330 W. 42 St., New York 36, N. Y.

PROTEIN CHEMIST

Nationally known food processor in New Jersey has permanent opening for experienced Protein Chemist for research work on proteins, amino acids, meat and meat products:

Up to 45 years of age
Ph.D. degree in Biochemistry, Organic Chemistry or Food Chemistry preferred
Food industry experience desired
Starting salary commensurate with training and experience

Submit detailed resume of personal history, education and experience to

P-8589
Food Engineering
330 W. 42 St., New York 36, N. Y

WE NEED!

FOOD TECHNOLOGISTS and FOOD CANNING CANDIDATES
—Juniors to top-level.

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
7 W. Madison St. Chicago 2, Ill.

WANTED
TO EXPEDITE PRODUCTION

Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pans, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.

P. O. Box 1351
Church Street Sta., New York 8, N. Y.

REPLIES (Box No.) Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

SUPERINTENDENTS
Bottling Maintenance (2)

Associate with a growing Eastern Co. Ideal position for a leader. Opportunity to apply & develop technical ability & ingenuity. Engineering degree preferred. Experience necessary. Liberal benefits. Salary open. Send resume to P-8607, Food Engineering
330 W. 42 St., New York 36, N. Y.

FOOD PLANT WANTED

We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets of stock of one or more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.

Address all replies
"Confidential" C. J. GALE, Sec.
233 Broadway, N. Y. 7, N. Y. BA 7-1819

WANTED by Food Processor:

SPRAY DRYER, s.s., approx. 700 to 1000 lbs. moisture dehydration per hour. Prefer cone type complete with auxiliary equipment. May consider use at present location if close to east coast and if other conditions warrant. Rental or drying proposals not excluded.

W-8620, Food Engineering
330 W. 42 St., New York 36, N. Y.

POSITIONS VACANT

HEAD FIELDMAN For midwest canner and freezer. Take complete charge of Field Department. Peas and corn major crops handled. All replies confidential. P-8449, Food Engineering.

PLANT ENGINEER — Graduate Mechanical Engineer 35 to 45 years of age for rapidly growing company in brewing industry. Must have minimum of 10 years total experience in various phases of plant engineering in process type of industry including drafting, plant layout, operation and maintenance of high speed bottling and packaging equipment, conveying and material handling systems, brew house and cellar installations, steam power plant and refrigeration systems. Must be executive type with managerial ability. Location East Central States. Give full resume in first letter. Our people know of this listing. Address all replies to P-8427, Food Engineering.

FLAVOR CHEMIST: Must have minimum B.S. Degree plus 3 years experience. Starting salary will be based on education and experience. Send complete resume, stating positions held, salary, etc., in full confidence. Our employees know of this advertisement. P-8614, Food Engineering.

WANTED—Experienced man in the field of jellies, marmalades and preserves. Plant near Palm Beach, Florida. We want this man immediately. Excellent opportunity. P-8617, Food Engineering.

POSITIONS WANTED

FOOD CONSULTANT — Food and Nutrition graduate. Will develop new products, new uses for products, and recipes for advertising. Work in plant or own test kitchen. PW-8445, Food Engineering.

EXECUTIVE POSITION in Food or Chemical Processing field. Broad experience in Sales Management, new product development and sales promotion, Factory Management. Enviable success record. PW-8625, Food Engineering.

POSITIONS WANTED

PLANT-PRODUCTION Manager, Graduate, 16 years experience, food, flour, feed, prepared baking mix plants. Offer experience in general management, sales, research. PW-8743, Food Engineering.

BIOCHEMIST, Ph.D. M.S. in food science, strong emphasis on Organic Chemistry, fats and oils. Industrial experience in development of new products. Age 26, married, veteran. Would like industrial research position, eastern location. PW-8747, Food Engineering.

PLANT OR Production Manager: Experienced Branch Plant Manager of leading food company. Knows scientific management, cost, labor relations, production and distribution. B.S. Degree in Industrial Engineering. PW-8378, Food Engineering.

PRODUCTION SUPERVISOR, capable technologist, thoroughly experienced processing and packaging operations desires opportune connection with established manufacturing organization where quality and volume are prime requisites. Good background in various industry fields including frozen foods and prepared specialty items. Will relocate. PW-8609, Food Engineering.

BUSINESS OPPORTUNITY

FOOD PRODUCTS Wanted: Progressive Canadian company with national distribution needs more products. Prefer manufacture under a license arrangement. Replies kept in strict confidence. BO-8351, Food Engineering.

WANTED

ANYTHING within reason that is wanted in the field served by Food Engineering can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

IF there is anything
you want . . .

that other readers
of this paper
can supply

or—
something
you don't want

that other readers
can use,
advertise it in the

SEARCHLIGHT SECTION

MODERN REBUILT EQUIPMENT
At Tremendous Savings

UNION Rebuilt Machinery Established 1912

International Stainless Steel Straightline Vacuum Filler, with automatic Feeder.

Resina Model LC automatic Capper.

Kyler A, Burt adj. Wraparound Labelers.

Baker Perkins BB, Unidor (Vacuum) Heavy Duty 50 to 150 gal. Double Arm Jacketed Mixers, Sigma or Fish Tail Blades.

Koven 2500 gal. Steam Jacketed Spiral Paste Mixer.

Day, Robison Dry Powder Mixers and Sifters, 100, 200, 600 lbs. cap.

Day 75 gal. Imperial, D.A. Jacketed Mixer.

850 gal. Steel Vertical S.J. Mixer.

B.P. type 3500 gal. Steam Jacketed Double Arm Mixer.

Day 650 gal. Jacketed Jumbo Mixer.

Stokes, Day, New Era, Hottman Mixers, 2 to 3500 gals. with/without Jackets, Single and Double Arm Agitators.

Fitzpatrick "D" Comminuter, 7½ HP.

Mikro 4TH, 3TH, 3W, 2TH, 1SH, Bantam Pulverizers; Schutz O'Neill Mills.

Day 40 x 120 Single Deck Sifter. Great Western—all models.

F. J. Stokes RD3 and RBB (1200+ per min.) Rotary Tablet Machines.

Colton 2, 3 Rotary & 4 Tablet Machines.

Pony M, ML Labelrites; Ermold, World semi, fully automatic Labelers.

Stokes & Smith Transwrap Filler.

S. & S. G1, G2, and G6 Auger Fillers.

F. J. Stokes HG88 Duplex Auger Filler.

Whiz Packer and Triangle Fillers.

Triangle Package Models G1, G2C, G2S, N2CA Elec-tri-Pak Fillers.

Horix and Elgin S. S. Rotary Fillers.

Filler 4, Hope 6 S. S. Piston Fillers.

Doughboy, Amsco Rotary Bag Sealers.

Standard-Knapp No. 429 Carton Sealer.

Hudson Sharp Campbell Cello Wrapper.

Hayssen; Package Machy. Co. FA, FA4, DF, CA2; Miller and Scandia automatic cellophane Wrappers.

Oliver 799E auto. cellophane Wrapper.

Shriver, Sweetland, Alsop Filter Presses.

Pneumatic automatic Cartoning Unit, 60 and 30 per min.

Additional Information and Prices Available on Request

UNION STANDARD EQUIPMENT CO.
318-322 Lafayette Street New York 12, N. Y.

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

FOR SALE

4 ft. & 5 ft. Stainless Steel Vacuum Pans.
200 gal. S.S. Tank 36" x 48", 1½ H.P. agit.
250 gal. S.S. Tank, 42" x 42", agit.
150 gal. S.S. Jkt. Kettle, 42" x 34", agit.
100 to 200 gal. S.S. Mix Tanks, water jkt.
200 gal. Pfaudler G. L. Tanks, water jkt.
300 to 4000 gal. Glass Lined Tanks.
26" Centrifugal Extractors, 3 H.P.
75 to 1500 gal. Homogenizers or Viscolizers.
Model 138C Stokes Vacuum Pump, 1½ H.P.
3000 gal. S.S. Truck Tanks, Trailerized.
32" x 90" Buflovak Double Drum Dryers.
5 H.P. Copeland Freon Refrigerating Unit.
3 Ton Clark Fork Lift Truck, solid tires.
30 and 60 H.P. Boilers, Oil Fired.
Milk Pasteurizers, Coolers, Fillers, Washers.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4616

ECH Offers UNUSUAL BUYS

A Photo Can Be Sent on Request

J. H. Day 2,000 Lb. Mixer with #31 Roball Sifter & Unloader, Center Discharge with 20 HP motor
Transwrap Machines, Model A-B & BB
Canem, Resina, Krammer & Elgin Cappers
Mikro Pulverizers #1, #2, #3 & #4
Day #31 Roball Sifter, 20" x 48" with motor
Day S/S Vac. Mixer, Jktd., Sigma Arms, 5 gal.
Burt & Knapp Can & Jar Labelers for all sizes
Robinson Attrition Mill, 24" Double Runner
Standard Knapp #429 Case Sealer & 20' Belt
Raymond Imp Mills #40 New #9000 with 10 HP
2 Gehnrich Shelf Dryers, 33" x 32" x 50"
Ross Heavy Duty, 40 gal. Pony Mixer
King Pfaudler 12 spout S/S Can Filler, 6 to 46 ozs.
2200 Gal. S/S Horizontal Tank, 17" manhole
Packaging Equipment of All Kinds. Makes & Sizes
Gluers, Wrapping, Dry & Wet Filling, etc.
New & Used Blenders, Steel & S/S, all sizes
New & Used Kettles & Tanks, All Metals & Sizes

Phone SOuth 8-4451—9264—8782
YOU CAN BANK ON

EQUIPMENT CLEARING HOUSE, INC.
289-10th ST., BKLYN 15, N. Y.

—FOR SALE—

1—Niagara Stainless Steel Jacketed Filter, Model #140-36.
1—Oliver Rotary Steel Continuous Filter, 11'6" x 14'.
3—Shriver Aluminum Plate & Frame Filter Presses, 24" x 24", Closed Delivery, 35 Chambers.
1—Sharples Stainless Steel Super-D-Hydrator, Model #C-27.
1—Link Belt Stainless Steel Roto-Louvre Dryer #310-16.
1—Buflovak Stainless Steel Rotary Vacuum Dryer, 5' x 20' with all auxiliary equipment.
1—Louisville Rotary Indirect Fired Experimental Dryer, 12" x 7½' complete.
3—J. H. Day #30 Imperial Jacketed Double Arm, Sigma Blade Mixers, 75 Gal. Working Capacity.

R. GELB & SONS, INC.
Est. 1886 UNionville 2-4900

FOR SALE

Bag Sealer: Amsco Hy-Speed model S.
Pulverizers: Mikro SH, 1SI, 4TH.
Dryer: Roto Louvre 5x20', monel metal.
Powder Mixers: 100 to 2000 lb. capacities.
Liquid Fillers: Vacuum and Siphon types.
Mixer: Read 380 gal., st. steel, 50 hp.
Centrifugal: Sharples airtight st. steel.
Kettles: Stain. Steel, all sizes, new and used.
Filter Presses: 7, 10, 12, 24".
Screens: 18x48" Selectro, 20x81" Rotex.
Mixers: Abbe Lenart s.s. 10 and 100 gal.
Fillers: Geyer, Kiefer, Visco, M&S., Elgin.
Labelers: New Jersey, World, Knapp, Burt, Ermold.
Dough Mixers: Day, Read, Hobart, Champion.
Cappers: Capem Pneu. Scale, Elgin, U. S.
Vacuum Pans: 36" and 42" stainless steel.
Filters: Alsop, Ertel, Sparkler, Industrial.

Send us a list of your idle equipment

LOEB EQUIPMENT SUPPLY CO.
1931 W. North Ave. Chicago 22, Ill.

MODERN PACKAGING EQUIPMENT
FOR IMMEDIATE DELIVERY

SPECIAL

PNEUMATIC SCALE CO. DOUBLE PACKAGE MAKER, Medium Size, Serial #9187, complete with motors. Price $1,700.00 F.O.B. our plant

PNEUMATIC SCALE CO. Automatic Cartoning Line, consisting of: Automatic Feeder, Bottom Sealer, Liner, Filler, Top Sealer & Compression Unit.
PNEUMATIC SCALE CO. Large and Small Liners.
PNEUMATIC SCALE CO. Tightwrap, High Speed.
PNEUMATIC SCALE CO.—WORLD and PONY fully automatic and semi-automatic Labelers, 60-120 per minute.
KARL KIEFER 16 Spout Stainless Steel Rotary Vacuum Filler.
PNEUMATIC SCALE CO., CONSOLIDATED AND RESINA fully automatic Cappers, 1, 3 and 4 Head.
STANDARD-KNAPP Model 429 Case Sealer and Compression Unit.
STANDARD-KNAPP Case Loader and Unloader.
STOKES & SMITH model HG84, Twin Auger Filler with Vacuum Attachment, Also Models G and GD.
PACKAGE MACHINERY Model FA Wrapper.

Partial List—send for complete list of equipment in stock.

WANTED
Single Machine or Entire Plants

ALLIED EQUIPMENT CO.
940-946 Nepperhan Ave., Yonkers 3, N. Y
Phone: Yonkers 5-0442

FMC

E-X-P-A-N-D-I-N-G?

Look to FIRST for Quick Delivery on ADDITIONAL EQUIPMENT

COMPLETE PLANTS
For Every Food Product

Ask about the RENTAL-PURCHASE PLAN

MIXERS

New and rebuilt ribbon type Mixers in steel and Stainless in all sizes

Heavy Duty Double Arm Mass and Do Mixers

KETTLES

New Stainless Kettles in New York stock in all sizes ready for immediate shipment. Stainless Tanks in stock at all times.

DRYERS and STERILIZERS

Buffalo and Devine Vac. Shelf Dryers from 3 shelf to 20 shelf in stock.
3 American Sterilizers 32"x48" and 42"x60"
Heavy Duty Horizontal Retorts; 6'x14'
Heavy Duty Jacketed Agit Vac. Cookers 4'x7'7"
Despatch Electrically Heated Oven or Tray Dryer 42"x58"x30" with 7 shelves

FILLERS

Horix SS 14 stem Automatic Grav-Vac. Fillers
Kiefer Rotary Vac. Fillers up to 24 stations
Ayers and Berlin Chapman S.S. Juice Fillers
M. & S. 10 Piston Stainless Steel Aut. Fillers
M. & S. 6 Piston Bronze Automatic Fillers
Filler Machine Co. Piston Fillers up to 11 stations

Food Machinery S.S. Hand Pack Filler

Triangle Electripak 4 Station Automatic Filler with conveyor
Stokes & Smith Model G1 Auger Type Filler

Automatic Cappers by Capem, Resina, Seamers and Sealers by Max Ams; Meat Grinders, Peelers, Kraut Cutters, Dicers, Slicers, Washers.

Pulpers, Juice Extractors, Colloid Mills, and Centrifugals.

Labelers, both semi-automatic and automatic; Can Casers, Gluers and Sealers and general packaging equipment.

FRED R. FIRSTENBERG, Pres.

FIRST MACHINERY CORP.
137 Hudson Street, New York 13, N. Y.

GOOD USED EQUIPMENT AT BARGAIN PRICES

1—Bird S.S. 48" Sus. Style Cent.
4—Vac. Shelf Dryers 6-17 Shelves.
5—Tray Dryers 16 to 250 Sq. Ft.
1—Buflovak Vac. Jack. 6' Crystallizer.
3—Stokes 212 C Vac. Pumps 100 cfm.
2—18" Sperry Jack. Filter Presses.
10—Sperry & Shriver 12" to 30" Filters.
3—Sweetland Filters #5 S.S. & #12 Brze Leaves.
1—Stainless Steel Condenser 370 Sq. Ft.
9—Stainless Tanks 100 to 16,000 Gals.
8—Jack. Kettles S.S. 125 to 300 Gal. Ag.
2—B.P. Mixers 20 Gal. Jack. DA-15 H.P.
1—Read Mixer 50 Gal. Jack. DA-40 H.P.
3—Autoclaves 50 Gal. Jack. 2000#. W.P.
1—Conveyor 24" belt x 33' Centers.
8—Horiz. Spiral Mixers 100 to 2000#.

Fillers, Labelers, Cappers, Conveyors, Pulverizers etc. Send for Bulletin A-31 with complete listings. We buy single items or complete plants.

THE MACHINERY & EQUIPMENT CORP.
533 West Broadway
New York 12, N. Y. GRamercy 5-6680

FOR SALE
RESINA SINGLE HEAD AUTOMATIC
SCREW CAPPER

SERIAL NO. 371 MODEL S

Equipped with bottle holders and stops for various wine, cordial, brandy and whiskey bottles. Also economy 16 oz. and 32 oz. bottle.

Was purchased new several years ago but used to cap 2000 cases only. Original paint—worth looking at.

$6100.00 F.O.B.
PROVIDENCE, R. I.
CRATED

CONCORDADE COMPANY, INC.
36 Burrington St. Providence 7, R. I.

FOR SALE
MARGARINE FILLERS
3—Albright-Nell. Complete with conveyors, motors, speed reducers, sealers, Pyrometers and S. S. overflow tanks. Used for manufacture of 1 lb. polyethylene squeeze-pack margarine. Purchased new 1948. Attractively priced.
G. J. Erlings
The Glidden Company—Cleveland 14, Ohio

NEW REBUILT USED
MACHINERY
FOR SALE
- World Rotary Labelers
- Standard Knapp Case Packer
- Straightline Vacuum Filler
- 20th Century Jug Washer
- Horix 14 Spt Auto. Filler
- Horman & Star Disc Fillers
- Stainless Tanks & Kettles
- Mixers, Conveyors, Etc.

IN STOCK FOR IMMEDIATE DELIVERY

PROCESS INDUSTRIES
307 POWELL ST. BROOKLYN 12, N.Y.
DICKENS 2-1021

WE HAVE IN STOCK FOR IMMEDIATE DELIVERY THE FOLLOWING TYPES OF EQUIPMENT

BOILERS
CANNING
CONFECTIONERY
DAIRY
FILLERS
MATERIAL HANDLING
STAINLESS STEEL JACKETED KETTLES
MEAT PACKING
MIXERS
MOTORS
PULVERIZERS
PUMPS
REFRIGERATION
SCALES
STAINLESS-STEEL TANKS
LARGE & SMALL STEEL TANKS

Consult Us for Your Food Processing Equipment
Send Us Your Inquiries
We Buy One Item or Entire Plants

AARON Equipment Company
1247 So. Ashland Ave., Chicago 8, Illinois
PHONE: CHesapeake 3-5300

6—COOKING KETTLES

Food Machinery, Style C, jacketed trunnion, 50 gallon capacity, designed for maximum pressure of 125#, as good as new, made of stainless steel, pure nickel and monel metal. On hand at Newport News, Virginia. Will consider worthwhile offer for one or all six.

ARKELL SAFETY BAG CO.
10 East 40 Street
New York 16 New York
or
Newport News Virginia

PACKAGING EQUIPMENT

4—Peters Automatic Carton & Liner Feeding machines, Type AC, speed 60 per minute; 4—Peters Carton Forming machines, Type ACE, speed 60 per minute; 1—Peters Carton Folding & Closing machine, Type DWY, speed 60 per minute; 1—Hayssen Carton Wrapping machine, Model 711, speed 35 per minute.

GROCERY STORE PRODUCTS CO.
LIBERTYVILLE, ILLINOIS

Glass-Lined Tanks

5—8,525 gal. one-piece A. O. Smith, glass-lined tanks, measuring 10' diameter by 16' long, immediate delivery; ideal for all types of foods; with manholes and sanitary fittings.
FS-8685, Food Engineering
330 W. 42 St., New York 36, N. Y.

FOR SALE
1—#2 Day Brighton Pony Mixer
1—Size 15 Class C Type VII Baker Perkins Mixer
FS-8053, Food Engineering
330 W. 42 St., New York 36, N. Y.

STAINLESS STEEL VOTATOR

for cooking and cooling fillings and custards, capacity 1500 lbs. an hour. 3 cylinders, steam freon and water 4" diameter, range 240° to 40°.
FS-8726, Food Engineering
330 W. 42 St., New York 36, N. Y.

If there is anything you want
or something you don't want that readers can supply—or use—advertise it in the
Searchlight Section

A BRILL BUY
... IS THE BEST BUY

SEE THESE VALUES!

1—Sharples C-27 Super-D-Hydrator, 316 Stainless Steel.
1—Hersey 4' x 26' Monel Rotary Dryer.
1—Hersey 3' x 26' Stainless Steel Rotary Dryer.
1—Link Belt Monel 2'7" x 8' Roto-Louvre Dryer.
4—Devine Vacuum Dryers 4, 6 and 10—40" x 43" shelves.
1—Devine #27 Vacuum Dryers 17—59" x 78" shelves.
2—Stokes 30" x 8' 3' x 15' Rotary Vacuum Dryers.
2—Pfaudler 1000 gallon, glass-lined, jacketed, agitated Kettles.
2—Pfaudler 100 gallon, glass lined, jacketed Stills with condensers and receivers.
3—Buflovak 5' x 12', 42" x 120", 42" x 90" double drum Dryers.
3—Groen 150, 125 gallon, Stainless Steel, agitated, jacketed Kettles.
3—Mikro Pulverizers #2TH Stainless Steel, #1SI, #1SH.
1—Day 2000# Powder Mixer and Sifter.
1—Robinson 4000# Heavy Duty Mixer.
6—Rotex 40" x 120", 40" x 84", 20" x 48" single and double deck Sifters.
1—Sperry 24' Aluminum P&F Filter Press.
1—Fletcher 48" Aluminum Suspended Centrifugal.

Send for complete stock list

BRILL
EQUIPMENT COMPANY

2401 Third Ave., N. Y. 51, N. Y.
Tel: CYpress 2-5703 - Cable: Bristen, N. Y.

FOR SALE

250 gal. Copper Steam Jacketed Kettles for 100 lbs. working steam pressure
300 gal. Copper Still with condenser and tank
80 qt. 3 speed Read Vertical Mixer
30 qt. 3 speed Hobart Vertical Mixer
#76 Enterprise Food Grinder, belt drive
Burns Split Nut Peanut Blancher, motor drive

SAVAGE BROS. CO.
2633 Gladys Ave. Chicago, Ill.

STAINLESS FILTER

Klein stainless steel diatomaceous earth filter, Model 1B, having 76 sq. ft. area, 11 screens, 20" diameter stainless tank, with separate closed, stainless slurry feeder, pressure type; with AC motor and drive; price only $1500 for complete unit.

FS-8687, Food Engineering
350 W. 42 St., New York 36, N. Y.

IN STOCK

3—Lee 300 gal. T316 stainless steel salad dressing starch base cookers, water jacketed, double motion agitators.
5—3000 gal. Horiz. Stainless Steel Tanks, insulated & agitated, sanitary fittings, excellent for transporting, storing or holding milk, food products, wines, etc.
35—Stainless Steel Tanks, 30, 60, 100, 150, 200, 300, 400, 500, 1000, 3000, 5700, 12,000 & 16,000 gal.
10—Stainless Steel shell and tube heat exchangers from 14 to 400 sq. ft.
3—Alsop SD-12-WR-30 T316 Stainless Steel Filters.
3—Stainless Steel Baffle Plate Columns or Extraction Towers, 5' dia. x 50' high.
3—13 gal. Stainless Steel Jacketed Autoclaves.
25—Aluminum Tanks, closed, 275, 330, 480, 500, 1350, 1450 gal.
8—15,000 gal. Vertical Steel closed Processing Tanks, 80# int. W.P., with 970' 3" pipe coil and turbine agitator with 40 HP drive.
2—Triangle G-2-C Elec-Tri-Pak Weighers & Fillers.
1—Elgin Twin Piston Filler
2—Mojonnier #90 Rotary Vacuum Fillers, 14-spout; stainless.
1—Pneumatic Scale Auto. Duplex Labeler, Front & Back.
1—Kyler model "H" Wrap Around Labeling Machine, to #10 cans.
1—N. J. Pony Semi Auto. Labeler.
1—Baker Perkins #14-JEM Universal Heavy Duty Mixer, 50 gal. work. cap.
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1—Stainless Steel Conical Blender, 11 cu. ft.
1—Stainless Steel T316 Bin, 275 cu. ft.
2—Sweetland Filters #10 and #12.
5—P&F Filter Presses, 10" to 36".
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1—Klein #2 Filter, Stainless Steel, 97 sq. ft.
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1—Prog. 2 spout S/S Filler, qts. and gals.
3—Lee S/S jack. Vacuum Pans, 250 gals., 300 gal., 500 gal.
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1—Patterson S.S. 110 gal. Vacuum Mixer, sigma blades.
4—Buflovac Atmo. Dbl. Drum Dryers, 32" x 72", 32" x 90", 42" x 120".
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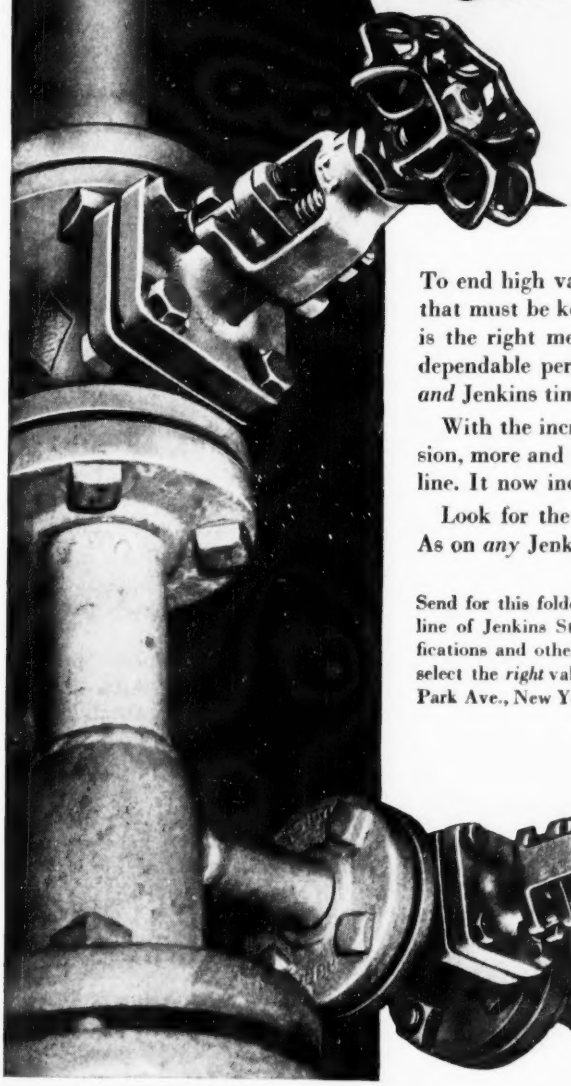
Jenkins Quality



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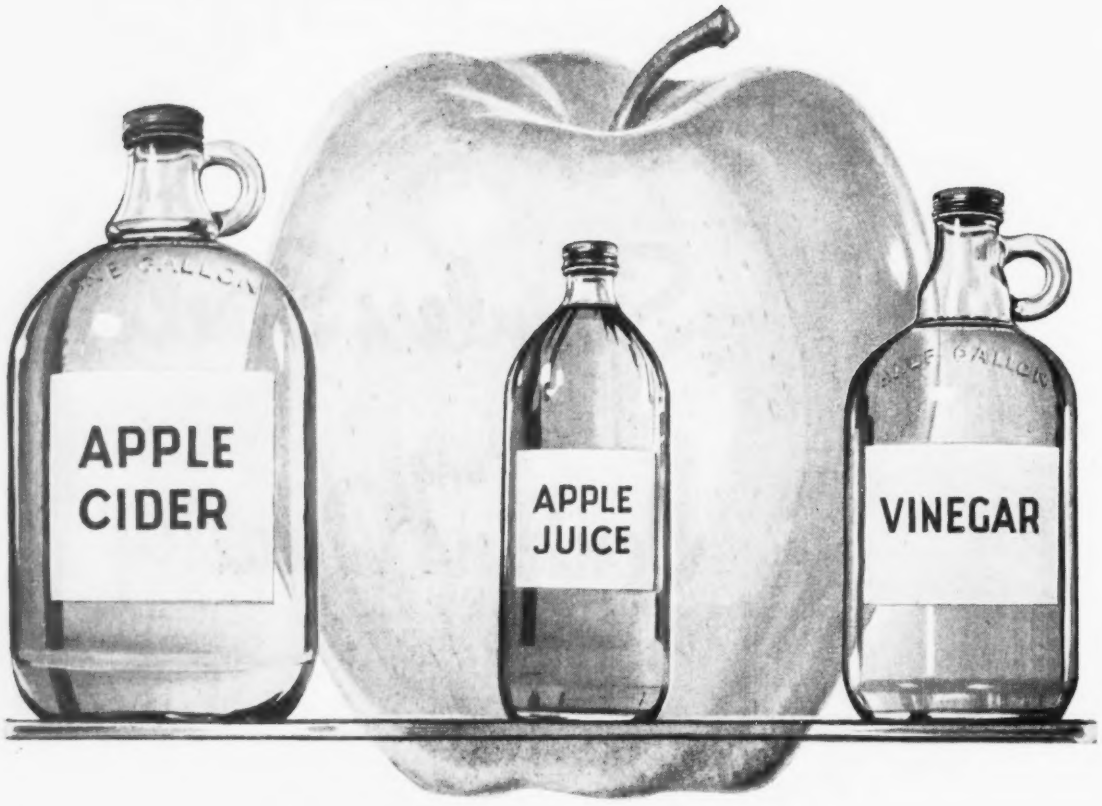

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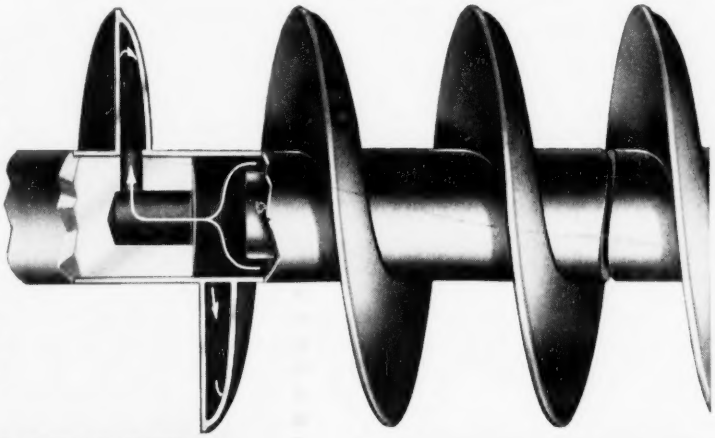

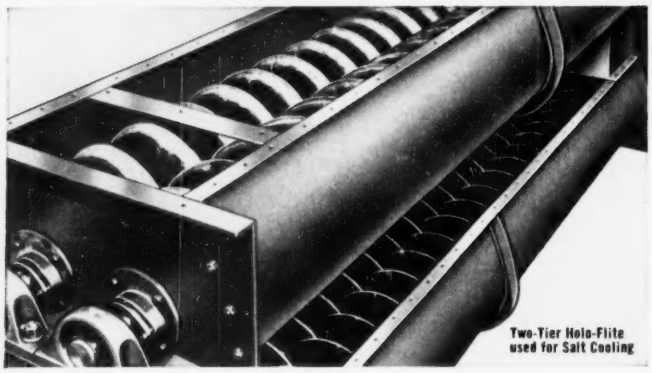

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*Reg. T.M.

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